The Alberta Journal of Educational Research

THE COMMITTEE ON EDUCATIONAL RESEARCH
Faculty of Education
University of Alberta

VOL. II, No. 1 MARCH, 1956

CONTENTS

PAGE

EDITORIAL 5

The High School Program in Alberta during the Territorial Period 1889-1905 7
B. E. Walker

A Normative Survey of Reading Achievement of Alberta Children in Relation to Intelligence, Sex, Bilingualism, and Grade Placement 18
Wm. H. Coull

A Critical Evaluation of the Detroit Beginning First Grade Intelligence Test 30
Frederick Powell

A Survey of the Arithmetical Achievement of Grade Five Pupils in Alberta Schools 41
Ralph O. Pritchard

Jacques Maritain: Man and Educator 49
Edward Blake Coll, C.S.B.

Texts in Measurement and Evaluation 57
S. C. T. Clarke and G. M. Dunlop

BOOK REVIEW 60
R. S. MacArthur

Digitized by the Internet Archive
in 2025

https://archive.org/details/alberta-journal-educational-research_1956_2_1-4

The Alberta Journal of Educational Research

THE COMMITTEE ON EDUCATIONAL RESEARCH
Faculty of Education
University of Alberta

VOL. II, No. 2 JUNE, 1956

CONTENTS

PAGE

EDITORIAL 69

A Challenge to the Faculty of Education 71
G. M. Dunlop

Insurance Practices and Experience of Division and County School Systems in the Province of Alberta 79
Harold J. Hall

The Administration of High Schools in Alberta During the Territorial Period, 1889-1905 96
B. E. Walker

The Rural High School in Alberta 105
Ralph L. McCall

An Evaluation of Arithmetical Competence in the Junior High Schools of Lethbridge 114
Stephen Benjamin Peta

The Alberta Journal of Educational Research

THE COMMITTEE ON EDUCATIONAL RESEARCH

Faculty of Education
University of Alberta

VOL. II, No. 3 SEPTEMBER, 1956

CONTENTS

PAGE

EDITORIAL 133

A Qualitative Analysis of Reading Achievement in Edmonton Schools 135
Campbell Young

A Study to Determine the Effect of Transiency on Grade Nine Departmental Examinations Marks 151
Verner R. Nyberg

Financial Assistance Available for Graduate Study in the Field of Education at Canadian Universities 156
Stanley G. Deane

To Teach, or Not to Teach 173
J. D. Aikenhead

An Evaluation of the Effectiveness of a Standardized Test of Language 186
C. H. Sangster

The Alberta Journal of Educational Research

THE COMMITTEE ON EDUCATIONAL RESEARCH

Faculty of Education
University of Alberta

VOL. II, NO. 4 DECEMBER, 1956

CONTENTS

PAGE

EDITORIAL 207

The Effects of Acceleration on the Academic Progress and of the Personal and Social Development of Edmonton and Calgary Grade X Students 208
Mary A. Beaton

The Objectives and Achievement of the Scottish Council for Research in Education 218
G. M. Dunlop

A Course Revision Committee in Action 223
J. R. Meredith

Observations on Science X as an Integrated Course in Physical Science 232
D. H. Jardine

The Evolution of the Mathematics Programme in Alberta High Schools 244
Irene E. Buckles

The Alberta Journal of Educational Research

Vol. II *1956*

THE COMMITTEE ON EDUCATIONAL RESEARCH
Faculty of Education
University of Alberta

Editorial

EDUCATIONAL RESEARCH—REVIEW AND FORECAST

G. M. Dunlop

At the beginning of the second year of continuous publication of the *Alberta Journal of Educational Research* it is proper to devote the editorial page to a review of the progess of educational research in Alberta, and to a forecast of its future.

The completion of the first year of publication of the Journal is an achievement in itself. It is the culmination of years of effort by many people whose names should be firmly fixed in the record. In the earlier history of the movement credit must be given to Dr. W. H. Swift, Mr. Rudolf Hennig, Mrs. D. A. Hansen, Mr. Lars Olsen, Dean H. E. Smith, Sir Arthur Stonhouse, Mr. A. G. Andrews, Mr. Eric Ansley and Mr. A. B. Evenson—representing University, Department, trustees, teachers, and the Home and School associations. In the later period of organization special mention must be made of the contributions of Mr. C. H. Macleod, Q.C., Chairman of the Board of Governors; President Stewart, Dr. W. H. Swift, and Dean Herbert E. Smith for what, in retrospect, seems to have been wise and perceptive guidance of the young movement. Finally, recognition must be given to the work of Dr. Harold S. Baker, whose responsibilities as editor, during the first year of publication, have been extremely heavy, and to the many competent research workers whose achievements constitute the actual research program in Alberta.

We are happy about our first year of publication. During this period we have made many errors, but we have also made provision for their correction. We have changed the format and binding of the Journal. Increasingly we are directing our attention to large definitive studies, involving many research workers, and away from the smaller projects of a single candidate for a degree. We propose to publish a quarterly *Research Newsletter* in which will appear more informal research reports, coupled with the news and gossip of the world of educational research. We plan the publication of *Research Monographs,* perhaps one each year. Each will report on groups of related studies previously published in the Journal, in a unified and carefully organized volume which should become a library resource for future students of educational research in Canada.

We have made a good beginning, but just a beginning. We need more funds donated to Capital Account, to secure the research move-

ment against depression or war. We need more funds donated to Current Account for the expansion of the ongoing research program. To this end new submissions are being prepared for all boards of school trustees and teachers' locals in the province. We hope for larger contributions from the five sponsoring bodies. We plan on the encouragement of contributions from business and industry.

We also need wider assistance and cooperation of interested individuals throughout the province. Not only do we need aid in the organizing and conducting of research; we also need aid in financing research and in the editing of research publications. We feel confident that there are many educationalists who will see these activities as legitimate and stimulating avocations for members of our profession.

The future is at once a challenge and an opportunity. The organization of the research movement, the development of a functioning research program, and the completion of a year of continuous publication of the journal are no mean achievements. It is not to be forgotten that our research movement is unique in Canada. With increasing support will come the steady enrichment of the research program, the improvement of the Journal and the publication of the newsletters and monographs. These developments may well contribute to the stature of Alberta in Canadian education.

THE HIGH SCHOOL PROGRAM IN ALBERTA DURING THE TERRITORIAL PERIOD, 1889-1905

B. E. Walker
Faculty of Education
University of Alberta

To what extent is the present high school program in Alberta a legacy from the North-West Territories? A comparison of the curriculum in Alberta today with that in the Territories about sixty years ago should reveal what significant changes have taken place. In this historical survey an attempt is made to describe some of the major characteristics of the secondary school program used in the North-West Territories.

A Prescribed Program of Studies

A notable feature of the development of the public school system of Ontario under the leadership of Egerton Ryerson was the organization of a strong central authority to prescribe curriculum for the whole province. The Ontario pattern of centralized control of curriculum was transplanted to the West and became firmly established in the North-West Territories.

The Legislative Assembly of the North-West Territories favored centralized control of the secondary school curriculum. When it provided in 1888 a special government grant of $350 per year for union high schools, the Assembly stipulated that the Territorial Board of Education should prescribe the program of studies. In 1892 the Assembly made the newly created Council of Public Instruction responsible for the preparation of a uniform curriculum for all school standards from one upwards, those above five being designated high school standards. In the same year there was added to the School Ordinance a section outlining a high school program as follows: ". . . the higher branches of a practical English and commercial education, the natural sciences, mathematics, and the Greek, Latin, French, and German languages."[1]

The first detailed program of studies for use in high schools in the North-West Territories was constructed by the Board of Education. In 1889 the Board of Education outlined a provisional program for the union high schools. In the following year the Board formally announced an extended and revised program.[2]

The high school program prescribed by the Board of Education contained a large number of academic subjects. For the school

[1]N.W.T., **Ordinances: 1888, ch. 59; 1892, ch. 22.**
[2]Board of Education, N.W.T., **Annual Reports: 1888-89, p. 7; 1890-91, pp. 20, 131.**

term ending June 30, 1891, each of the two high schools at Calgary offered the following subjects: reading, dictation, composition, writing, arithmetic, ethics, drill, grammar, geography, history, literature, bookkeeping, drawing, algebra, geometry, agriculture, physiology, hygiene, and Latin. The Calgary Separate High School offered, in addition, music, needlework, and French. The Calgary Public High School offered, in addition, botany and chemistry. Each high school teacher taught more than a score of subjects; each high school student pursued about a score of subjects.

The program prescribed by the Board of Education was noteworthy from the point of view of sectarian elements in the curriculum. Until 1892 the School Ordinances permitted a dual system of education. The Protestant section of the Board of Education announced the program for the Protestant schools, and the Roman Catholic section announced the program for the Roman Catholic schools. Judging from the programs offered in Calgary Protestant High School and Calgary Roman Catholic High School, there was almost complete agreement regarding the titles of courses considered suitable for the high school. There were, however, some basic differences in the content of certain subjects. The two Calgary high schools used different literary and historical materials as revealed in certain final examinations written by the candidates from the two schools. The two sections of the Board of Education cooperated each year to set one test paper in most of the high school subjects, but each section usually preferred to set its own paper in literature, reading, and history.

The change from the Board of Education to the Council of Public Instruction had significant consequences for the high school curriculum. The dual type of sectarian curriculum was replaced by a uniform, nonsectarian curriculum. After 1892 the program of studies prescribed by the central authorities contained no syllabus of religious instruction. Local authorities were permitted, if they so desired, to arrange for not more than a half hour of religious instruction at the end of the school day. In all the higher standards the authorized textbooks were the same for all tax-supported schools, care being taken to authorize only those texts written from a nonsectarian point of view. The external high school examinations were uniform for all candidates, regardless of religious denomination. The policy of prescribing a uniform, nonsectarian program of studies was continued when the Department of Education replaced the Council of Public Instruction in 1901.

In all the territorial high school programs there was adherence to the principle of centralized control of curriculum. Territorial

government agencies prescribed the program of studies to be used in all public secondary schools.

A Program Shaped by Teacher Examinations

Teacher preparation was a dominant aim of the territorial high school program. The desire of the Board of Education to obtain a greater supply of trained elementary school teachers was reflected in certain features of the union high school program.

One striking feature was the close correspondence between the high school program and the program of academic subjects required for teachers' certificates. This correspondence is made clear in the following announcement: "The subjects of Standard V constitute the subjects of examination for the third class certificates, and those of Standard VI, except Latin and French, the subjects for the second class."[3] In equating the high school program with the academic requirements for teachers' certificates, the Board of Education set a far-reaching precedent for the future development of the high school curriculum in Alberta.

The inclusion of professional courses for teachers was another significant feature of the early high school curriculum. The School Ordinance passed by the North-West Assembly in 1888 provided that the Board of Education might authorize the establishment of a normal department in a union high school. In 1890 the Board arranged for the principal of Moosomin Union High School to offer, along with the regular academic program, a professional course consisting of a set of lectures on the science and art of teaching. Later, after receiving complaints that too much of the principal's time was being devoted to the professional training of teachers, the Board organized normal school courses conducted by school inspectors. Short normal sessions with low enrollments were conducted by school inspectors at Moosomin and Regina Union High Schools. In 1892 the Board offered to conduct normal sessions at the union high schools at Calgary, but no students accepted the invitation.[4] The attempt to organize normal school departments in union high schools was only partly successful in Assiniboia district and not at all successful in Alberta district.

The desire of the territorial school authorities to use the high schools to train elementary school teachers was also reflected in the close continuity between elementary and secondary school programs. For the most part the curriculum of the early high schools was a continuation and extension of the elementary school program. This was especially evident in the work in literature, composition,

[3] **Ibid., 1889-90, p. 7.**
[4] **Council of Public Instruction, N.W.T., Report, 1896, p. 16.**

grammar, spelling, reading, writing, history, geography, arithmetic, drawing, drill, and agriculture. Typical descriptions of courses in the official union high school programs were "the subject continued," "extension of the course," and "a review of English and Canadian history." Many of the texts used in the lower high school standards were the same as those used in the upper elementary school standards. The study of English was the main part of the program in both elementary and high school. The prominent place of English in the territorial high school curriculum reflected nineteenth century trends in United States and Canada in which English displaced Latin as the main secondary school subject. The organization of a high school program as a continuation of the vernacular elementary school program was an important step in the development of a free and universal system of public education with a single ladder from primary to secondary level.

The annual examinations of teachers' certificates administered by the state authorities had a dominant influence on the curriculum of the high schools in the North-West Territories. Beginning in 1886 the subjects of these examinations were similar to those of the elementary school program, the content being largely a review and extension of the work of the elementary school. A few professional courses were added: the science and art of teaching, physiology and hygiene, and school law. The examinations written in midsummer 1893 by the candidates for teachers' certificates were grouped as follows:

Third Class

Group 1 History, Geography
2 Literature, Composition, Grammar
3 Bookkeeping, Geometry, Algebra, Arithmetic
4 Science and Art of Teaching
5 Dictation, Writing, Reading
6 Drawing (optional), Agriculture (optional)

First and Second Class

Group 1 History, Geography
2 Literature, Composition, Grammar
3 Bookkeeping, Geometry, Algebra, Arithmetic
4 Science and Art of Teaching, School Law, Physiology and Hygiene
5 Dictation, Reading, Writing
6 Drawing (optional)
7 Agriculture (optional)[5]

Because there was such a strong pull to prepare the high school students for these examinations, the Council of Public Instruction found it expedient to allow the teachers' nonprofessional program to serve as the prescribed high school curriculum. There is ample evidence that the courses taught in the high school standards from 1893 until 1902 corresponded almost entirely with the academic

[5]N.W.T., Record Book, Nonprofessional Examinations, 1893-1902.

courses prescribed for the first, second, and third class teachers' certificates.[6]

A Fixed Academic Program

The territorial high school program, prescribed by the central government authority and dominated by the examinations for teachers' certificates, consisted almost entirely of a fixed range of subjects in the fields of English, mathematics, science, history, and geography. From the beginning English was enthroned as the king of the subject-matter fields in territorial high schools. Almost invariably listed first in official programs, always obligatory, always an important part of the examination system, English continued as the main subject field throughout the history of the territorial high schools. In the earliest territorial high schools the English offering took the form of six courses in the teachers' nonprofessional program: literature, composition, grammar, dictation, reading, and writing. By the end of the territorial period the English subjects offered in each standard were reduced to four: reading, literature, composition, and grammar. Literature and composition, the examination subjects of standard six, emerged as the two main courses in the field. Grammar or rhetoric still survived as a separate examination course in standards seven and eight.

The literature course for standard six provides a good example of the approach to literature in territorial high schools. The policy was to prescribe a few poetical selections for intensive study. The memorization of "fine passages" was an important part of the program. The prescribed poems were almost always from the writings of the British poets of the Romantic and Victorian eras; Wordsworth and Tennyson were the favorites. Sometimes the selections would include a poem by the American poet Longfellow. For prose literature the prescribed selections were from the classics; for example, two plays by Shakespeare, or a novel by Scott. It was the custom to change each year the authorized poetical and prose selections of the literature course. In addition to the literature course with emphasis upon intensive study of a few prescribed selections, there was usually a reading course in which students were required to read extensively five classics. Longer poems, plays, and novels were the chief types.

Mathematics was a stable subject field in territorial high schools. Geometry and algebra were always on the list of subjects for each high school standard. In geometry the books of Euclid were studied. In algebra the main work was on equations, but the work was continued through progressions, series, and logarithms. Arithmetic

[6]Gerald Langley, "The Programme of Study Authorized for Use in the North-West Territories to 1905, and the Province of Saskatchewan to 1931, and the Textbooks prescribed for Use in Connection Therewith", pp. 105-108.

was an obligatory subject in the lower high school standards: *Hamblin Smith's Arithmetic* was the perennial textbook. A trigonometry course, which became a regular fixture in standard eight, completed the secondary school offering in the field of mathematics.

In contrast to the unchanging mathematics program, the science program underwent frequent changes in the territorial high schools. There was little science in the first union high school programs. The physiology offered in the high school rooms in Calgary in the school year 1890-91 was a semiprofessional course intended for prospective teachers. In that year physiology was the only science taught in the Roman Catholic Public Separate High School at Calgary. In the Calgary Protestant Public High School in the same year about one-third of the students were studying physiology, and a very small number of senior students were studying botany and chemistry. No natural science subject was included in the teachers' nonprofessional examinations written in midsummer 1893. The revised teachers' nonprofessional program announced in 1895 put more stress on science: botany and physics became examination subjects in all three standards, with chemistry as an additional science subject in standard eight. Three years later biology was added as another science subject in standard eight. In the revision announced in 1902 there was a complete rearrangement of the science offering, with botany and physics in standard six, animal life and chemistry in standard seven, and physics in standard eight.

A great deal of the high school work in geography and history was a review and continuation of work covered in elementary school standards. The aim apparently was to prepare high school students to teach geography and history in the elementary schools. In standard six there was an intensive review of world geography, called "map geography generally." There was a special study of the geography of the British Empire. Physical geography was at first a part of the general course in geography, but towards the end of the territorial period was made a separate subject of study in standard seven. In the history course of standard six the work was largely a review of British and Canadian history. The stress was on military and political developments. In the upper high school standards the student might study some other phases of history: constitutional history of England and Canada, industrial history of England, or outlines of world history.

Foreign languages were offered but not stressed in territorial high schools. French and Latin were taught in the union high schools in Calgary. During the 1890's foreign languages declined in importance in territorial high schools, largely because they were not included in the teachers' academic program. Any work in the

foreign languages was usually determined by the matriculation requirements of the universities in Manitoba or Ontario. There was some revival of interest in foreign languages about 1902, when the new territorial program listed Latin, French, and German as official high school subjects, and permitted students to elect a foreign language in place of mathematics or science. The traditional grammar-translation method was commonly used in teaching foreign languages. The chief objectives were reading and writing skills, achieved through the close study of grammar and numerous translation exercises from English into the foreign language.

TABLE I

HIGH SCHOOL TEXTBOOKS
TERRITORIAL PERIOD 1889-1905*

Subject	*Textbook*
Agriculture	Ontario Public School Agriculture
Botany	Spotton's Botany
Algebra	Ontario High School Algebra Part 1 C. Smith's Elementary Algebra
Arithmetic	Hamblin Smith's Arithmetic
Composition and Retoric	Welsh's Composition Genung's Practical Elements of Rhetoric Genung's Handbook of Rhetorical Analysis
Bookkeeping	McLean's High School Bookkeeping
Geography	The High School Geography New Canadian Geography (N.W. edition) Dawson and Sutherland's Geography of the British Colonies Tarr's Elementary Physical Geography
Geometry	McKay's Euclid Todhunter and Loney's Euclid
Grammar	Ontario Public School Grammar Ontario High School Grammar Seath's High School Grammar
History	Buckley and Robertson's High School History Clement's History of Canada Swinton's Outlines of World History Bagehot's English Constitution Bourinot's Constitutional History of Canada
Physics	Gage's Introduction to Physical Science
Chemistry	Kirkland's Experimental Chemistry
Trigonometry	Hamblin Smith's Trigonometry Murray's Plane Trigonometry

*Data from *Reports*, N.W.T—Board of Education, 1885-1891; Council of Public Instruction, 1896, 1898, 1900; Department of Education, 1901-1904. Only those books authorized for five years or more are included above.

There was a narrow range of vocational subjects offered in the territorial high schools. In addition to the teachers' professional courses already described, agriculture and bookkeeping were sometimes offered in the lower high school standards. The textbooks authorized largely determined the content of these courses. It must have been difficult to relate the Ontario agriculture textbook to farming and ranching conditions in the North-West.

There was a neglect of aesthetic elements in the territorial high school program. Music was never listed in the official high school programs announced by the central territorial authorities. Any music included in the program was offered through local initiative. For instance, Sister Greene taught vocal music in the high school department of the Separate School District in Calgary. The drawing course in the early territorial high schools was of the linear type with an abstract and geometric emphasis.

Textbooks played an important part in the secondary school sytem of the North-West Territories. High school courses were usually announced in terms of the content of a prescribed textbook. Only those texts prescribed by the central authorities could be used. Many of the texts authorized year after year became well-known. Table I gives the titles of the textbooks used for five years or more during the period in which public high schools were in operation in the North-West Territories.

An Attempt to Introduce the Elective Principle

With the dawn of the new century the Government of the North-West Territories gave formal recognition to the increasing importance of public education. At the top school administrative level a fully organized and efficient Department of Education replaced the unwieldy Council of Public Instruction. At the level of secondary school curriculum the Department of Education announced a new high school program. It was significant that this program was announced as "The High School Program for Standards Six, Seven, and Eight." Previously the Council of Public Instruction had always announced all curriculum changes at the secondary school level under the title "Teachers' Non-professional Program for Certificates of the First, Second, and Third Class." This change of title was a formal recognition of the increasing importance of high school education as a preparation for citizenship on a broad basis.

D. J. Goggin, superintendent of schools for the North-West Territories, was mainly responsible for the revision of the high school program. Dr. Goggin was in favor of broader aims for secondary education. In his opinion the high school should amplify

the work of the elementary school and provide a broad preparation for life. Only in an incidental way should the high school prepare young people for admission to normal schools and colleges.[7]

In 1902 the Territorial Department of Education announced the high school curriculum as revised by Dr. Goggin. In this new program the Department attempted to introduce the elective principle by listing certain subjects as obligatory and others as optional, as shown in Table II.

TABLE II

PROGRAM OF STUDIES FOR THE HIGH SCHOOL, NORTH-WEST TERRITORIES, 1902*

Standard six

1. Reading
2. Composition
3. Literature
4. Grammar and Rhetoric
5. History
6. Geography
7. Arithmetic and Mensuration
8. Algebra
9. Geometry
10. Bookkeeping
11. Botany and Agriculture
12. Physics
13. Drawing
14. Latin
15. French
16. German

Obligatory subjects: 1, 2, 3, 4, 5, 6, 7, 8, 9, 11 (Botany), 13.
Optional subjects: 10, 11 (Agriculture), 12, 14, 15, 16.
Examination subjects for students intending to become teachers or enter a profession: 2, 3, 5, 6, 7, 8, 10, 11, 12, 13.

Standard seven

1. Reading
2. Composition
3. Literature
4. Grammar and Rhetoric
5. History
6. Geography
7. Algebra
8. Geometry
9. Animal life
10. Chemistry
11. Drawing
12. Latin
13. French
14. German

Obligatory subjects: 1, 2, 3, 4, 5, 6, 7, 8, 9, 11.
Optional subjects: 10, 12, 13, 14.
Examination subjects for students intending to become teachers or enter a profession: 2, 3, 4, 5, 6, 7, 8, 9, 10.
Electives: Latin instead of Algebra.
French or German instead of Grammar and Rhetoric or Chemistry.

Standard eight

1. Reading
2. Composition
3. Literature
4. Language and Rhetoric
5. History
6. Algebra
7. Geometry
8. Trigonometry
9. Physics
10. Latin
11. French
12. German

Obligatory subjects: 1, 2, 3, 4, 5, 9.
Optional subjects: 6, 7, 8, 10, 11, 12.
Exanmination subjects for students intending to become teachers or enter a profession: 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12.
Electives: Latin instead of Algebra.
French or German instead of Geometry or Trigonometry.

[7]Council of Public Instruction, N.W.T., **Report**, 1900, p. 26.

*Data from *Annual Report*, Department of Education, N.W.T., 1902, Appendix H.

The new territorial high school program announced in 1902 was acclaimed as a forward step in education because it introduced the elective principle. The principle was in accord with contemporary developments in curricula at the secondary and higher levels in other parts of the continent. The introduction of optional and elective subjects was a way of recognizing individual differences among students. It was a phase of the popularization of the high schools.

Although the theory of elective high school subjects seemed to conform to the main social trends of the time, there were serious limitations in the application of the theory in the high schools of the North-West Territories. In the first place, practically all the subjects, optional as well as obligatory, were of an academic nature. In the second place, the external examinations for students intending to become teachers or to enter a profession continued to exert a dominant influence on the instructional program organized by the principal of each high school. In the third place, the high schools of the North-West Territories were too small to permit extensive application of the theory of elective subjects; the largest high school departments in Calgary and Edmonton had only two or three staff members devoting their time exclusively to instruction at the high school level. For most students in the territorial high school the instructional program remained fixed and academic.

Summary

Some significant precedents with respect to high school curriculum were established during the territorial period. One important development was adoption of centralized control, with prescription of the high school program by an agency of the territorial (later provincial) government. Another early development of considerable importance was the influence of the teachers' nonprofessional examinations in shaping the high school program. Later, after the formation of the province, admission requirements to provincial normal schools continued to be a major factor determining the type of program offered in high schools.

Curriculum construction in the territorial period was largely a matter of selecting and prescribing a series of textbooks. Many of the books selected were from those which had been published and authorized for use in Ontario.

A survey of the early high school curriculum points up certain changes that have taken place during the past half century. A characteristic feature of high school programs during the territorial period was the large number of subjects pursued by each student at a given time: a load of twelve or more subjects was the usual

practice. Since that time there has been a tendency to reduce, by integration or elimination, the number of such subjects. Another noticeable trend of the past half century has been the introduction of the elective principle, so that each high school student is no longer required to follow a fixed program, but may elect, within limits, from a wide and varied range of subjects.

BIBLIOGRAPHY

Aylesworth, Nellie. "A History of the High School Courses of Study for Alberta." Unpublished Master's thesis, University of Alberta, 1936.

Bell, Walter. *The Development of the Ontario High School.* Toronto, University of Toronto Press, 1918.

Board of Education, North-West Territories. *Annual Reports,* 1885-1891. Regina, Printer to the Government of the North-West Territories. (Microfilm copies in the Rutherford Library, University of Alberta, Edmonton, Alberta.)

Council of Public Instruction, North-West Territories. Record Book, Non-professional Examinations, 1893-1902. (Manuscript document in the files of the Department of Education, Regina, Saskatchewan.)

Council of Public Instruction, North-West Territories. *Reports,* 1896, 1898, 1900. Regina, Printer to the Government of the North-West Terriories. (Copies in the Legislative Library, Edmonton, Alberta.)

Department of Education, North-West Territories. *Annual Reports,* 1901-1904. Regina, Printer to the Government of the North-West Territories. (Copies in the Legislative Library, Edmonton, Alberta.)

Kandel, I. L. *History of Secondary Education.* Boston, Houghton Mifflin Co., 1930.

Langley, Gerald. "The Programme of Study Authorized for Use in the North-West Territories to 1905, and the Province of Saskatchewan to 1931, and the Textbooks Prescribed for Use in Connection Therewith." Unpublished Master's thesis, University of Saskatchewan, 1944.

North-West Territories. *Ordinances,* 1888-1901.

A NORMATIVE SURVEY OF READING ACHIEVEMENT OF ALBERTA CHILDREN IN RELATION TO INTELLIGENCE, SEX, BILINGUALISM, AND GRADE PLACEMENT*

WILLIAM H. COULL
Principal, Crestwood Elementary School, Edmonton

The Problem

Since 1880 more than twenty-seven hundred scientific studies related to reading have been published in the United States and England. During the last three decades an unprecedented interest in reading problems has resulted in a great increase in the number of investigations reported and in the range of problems studied. The ever-increasing body of knowledge of reading has brought about many changes in curricula and educational procedures.

In 1953 Dr. G. M. Dunlop and Dr. R. E. Rees of the Faculty of Education undertook the direction of a project to gather data concerning the language arts in Alberta schools. They worked with the assistance of the Research Committee of the University of Alberta and the approval of the Department of Education. Their efforts have resulted in the collection of data that have become useful in many studies in the language arts field.

The present study is but a small part of the provincial survey. Its general purpose is to contribute in some measure to the improvement of reading instruction. The recognition of individual differences emphasizes and demonstrates the importance to educational achievement of such factors as intelligence, sex differences and native language. The specific purposes of this study are to determine the relationship of intelligence, sex and bilingualism to reading achievement. An additional purpose is to present data that will determine the status of reading achievement of Alberta students in terms of grade placement.

Experimental Design

The committee in charge of the project decided that a testing program in grades IV and VII would provide a body of data that would be useful in determining achievement of Alberta students in fields relating to language. The selection of pupils to be tested met the demands of random sampling in that every person in the population had an equal chance of being drawn.

*This study sponsored by the Alberta Committee on Educational Research.

In order to insure a balanced sample the province was divided into eight separate regions on the basis of geographic, socio-economic and language factors. From each of these areas one town was randomly selected in which the school population was between 250 and 1000. The selection of graded rural and ungraded rural samples from each of the eight divisions was roughly proportional to the total school population of the area. Graded rural children were randomly chosen from classrooms in towns having a school population less than 250. Of these, only children who were actually rural residents were used. The ungraded rural sample was obtained by testing children of randomly-chosen school divisions in each of the eight typical areas. All pupils in the grades concerned were tested and their papers randomly chosen by Faculty of Education workers. Edmonton and Lethbridge were randomly chosen to represent the large urban and small urban populations respectively.

The number of pupils tested for the reading survey appear in Table I.

TABLE I

SAMPLE SIZES OF PUPILS PARTICIPATING IN ALBERTA READING SURVEY

Sample	Grade IV	Grade VII	Total
Large Urban	196	197	393
Small Urban	150	149	299
Town	209	221	430
Graded Rural	215	161	376
Ungraded Rural	183	189	372
Totals	953	917	1,870

Detailed instructions regarding the administration of the tests were sent to the various teachers, principals and superintendents in order that testing procedures would be uniform. With the completion of the testing, all papers were returned to the University of Alberta where the Faculty of Education arranged to have them marked and the results recorded. Results were recorded on data assembly sheets and individual results were complied and recorded for each pupil tested.

In any testing program the selection of the testing instruments is of prime importance. Considerations must be given to the purposes of the program, the cost of test materials, the facility of

administration and the validity of results obtained. With these criteria in mind, the California Short-Form Test of Mental Maturity, Elementary (1950 S-Form), was chosen as a measure of intelligence; the Elementary and Intermediate Forms AA of the California Reading Test were chosen as measures of reading achievement.

In discussing the California Test of Mental Maturity, Garrett[1] indicates that validity is chiefly inferred, but a correlation of .88 with the Stanford Binet Test is stated for an unspecified level and range. No data are presented on the test's relationship to subsequent school achievement or to other appropriate criteria. Cattell[2], in discussing the California Test of Mental Maturity, says,

> These tests are exceedingly well designed from the point of view of adaptation to school needs and the convenience of the teacher. All the data regarding consistencies, standardization and correlation with school progress that one could reasonably demand, are clearly presented.

The authors of the California Reading Tests describe their tests as instruments for "accurately and objectively measuring pupil achievement in fundamental reading skills."[3] The reliability coefficients of the reading forms in terms of grade placement are .93 for the elementary test and .92 for the intermediate test.

As the authors give assurance that the California reading tests are but revisions of the Progressive Reading Test, Witty's[4] remarks should apply.

> The Elementary Reading Test is especially well-adapted for survey and diagnostic purposes . . . the results can be readily comprehended, interpreted and applied by classroom teachers.
>
> The tests in the Intermediate series appear to satisfy the criterion of validity . . . at present these tests have no equal as practical survey and diagnostic instruments.

Flanagan[5] concludes his evaluation of the California Reading Tests with the following statement.

> The California Reading Test is valuable for appraising the progress of pupils with respect to their important skills of vocabulary and comprehension.

In view of the fact that each of the California tests requires less than an hour to administer it appears that they meet the criterion of time economy. The organization of material and provision of diagnostic or analytic features make them especially valuable to the teacher or administrator. It would seem that these testing instruments satisfy the demands of the survey.

In the statistical treatment of the data the relationship between Total I.Q. and Total Reading scores was determined by the cal-

1Henry E. Garrett, **The Third Mental Measurements Yearbook**, p. 224.
2Raymond B Cattell, **The Nineteen Forty Mental Measurements Yearbook**, pp. 1193-94.
3**Manual, California Reading Test**, p. 2.
4P. A. Witty, **Third Mental Measurements Yearbook**, p. 15.
5J. C. Flanagan, **Fourth Mental Measurements Yearbook**, pp. 568-570.

culation of the product-moment coefficients of correlation. The data used were drawn from five stratified samples of grade VII Alberta pupils. In order to evaluate the reliability of the coefficients of correlation obtained they were tested against the null hypothesis. Computed values were used to determine significance of differences between coefficients of correlation.

Comparison of boys and girls of grade seven in intelligence and reading achievement was made on the basis of 400 randomly-chosen scores. Frequency distributions were compiled for the Total I.Q. and Total Reading scores. The arithmetic means, standard deviations, and standard errors were computed.

The significance of mean differences between boys' and girls' scores was tested by computing the mean differences, the standard errors of the differences and the critical ratios. To test the significance of the computed critical ratios reference was made to a table of significance of statistics of small samples. The null hypothesis was retained for critical ratios less than 2.58 at the .01 level of confidence and for critical ratios less than 1.96 at the .05 level.

Variability from sample to sample was determined by the calculation of standard deviations, differences in standard deviations and critical ratios obtained from these differences. Critical ratios were subjected to the test of the null hypothesis for significance of difference. Bilingual samples were compared in a similar manner.

The means and standard deviations of each sample in grades IV and VII were combined for reading vocabulary totals, reading comprehension totals and total reading. The corresponding grade score for each mean score was determined from the test manuals. The yearly increment was computed by dividing the grade score obtained by the grade level at time of testing.

Reading Achievement and Intelligence

A relationship between reading ability and intelligence has long been recognized. Dolch[6] says, "The strongest single factor in the pupil's success in reading is undoubtedly his degree of intelligence." This study attempts to obtain some measure of the relationship between reading achievement and intelligence test scores for Alberta students at the grade VII level.

The coefficients of correlation between reading achievement scores and intelligence test scores range from + .67 to +.81. The computed coefficients of correlation and corresponding probable

[6]Edward W. Dolch, **The Psychology and Teaching of Reading**, p. 139.

errors of the coefficient appear in Table II for each of the five samples tested.

TABLE II

CORRELATION BETWEEN READING ACHIEVEMENT AND INTELLIGENCE OF FIVE SUBSAMPLES OF GRADE VII ALBERTA STUDENTS

Sample	N	r	PE_r
Large Urban	196	.81	0.02
Small Urban	145	.67	0.03
Town	218	.74	0.02
Graded Rural	190	.69	0.03
Ungraded Rural	185	.71	0.03

The reliability of a coefficient of correlation may be tested against the null hypothesis that the computed coefficient does not depart significantly from zero. In the formula

$$t = r \frac{\sqrt{N-2}}{\sqrt{1-r^2}}$$

r represents the coefficient of correlation, and N is the size of the sample.[7] The t values were computed for each of the five subsamples. It was found that each coefficient of correlation was highly significant at the .01 level, making it necessary to reject the null hypothesis and thereby establishing the fact that the coefficients do depart from zero.

As a test of the reliability of the difference between coefficients of correlation, the significance of the difference between coefficients was computed. By a comparison of the t values obtained with those of the table of t, it is possible to test the hypothesis that the five sample values of r are drawn from the same population. Table III reveals significant differences between large urban and small urban samples at the .01 level of confidence.

A similar significant difference may be noted between the large urban and graded rural samples. As all five samples were randomly drawn from the grade VII Alberta population, any difference in the relationship between intelligence and reading achievement would normally result from causes other than those of sampling.

[7]Henry E. Garrett, **Statistics in Psychology and Education**, p. 298.

TABLE III

COMPARISON OF COEFFICIENTS OF CORRELATION BY THE USE OF FISHER'S Z FUNCTION

	Large Urban	Small Urban	Town	Graded Rural
Ungraded Rural	2.4	0.73	0.6	0.4
Large Urban	.....	2.91*	1.0	2.75*
Small Urban	.....	.....	1.27	0.36
Town	.....	.....	.....	1.01

*Significant at the .01 level.

The findings of relationship between reading achievement and intelligence would appear to corroborate the findings of others in this field. Significant differences that exist between some of the samples do not appear to be attributable to sampling errors. Differences in school organization, administrative and supervisory practices, instructional procedures or subject emphasis may account for the range of correlation coefficients. The finding indicates that the subject warrants further study.

Sex Differences

A review of the literature regarding sex differences reveals a superiority of girls in language arts. On the basis of the superiority displayed by girls in reading readiness tests, Anderson and Dearborn[8] suggest that the general factor of rate of maturity is at work favoring girls, and that the difference is not referable to specific language entities. The additional fact, as found by Stroud and Lindquist[9], that differences appear early and tend to disappear as the child grows older lends further support to the contention.

The selection of subjects in this study was made to conform to the criterion of randomness. Two hundred boys and two hundred girls from grade VII were chosen and their scores on the California Test of Mental Maturity and the California Reading Tests used for statistical treatment.

[8]Irving H. Anderson and Walter F. Dearborn, **The Psychology of Teaching Reading**, p. 35.

[9]J. B. Stroud and E. F. Lindquist, "Sex Differences in Achievement in the Elementary and Secondary Schools", **Journal of Education Psychology XXXIII**, pp. 657-667.

Table IV compares the mean scores obtained on both tests.

TABLE IV

COMPARISON OF MEAN SCORES IN INTELLIGENCE AND READING OF GRADE VII BOYS AND GIRLS

	N	Total I. Q.	Total Reading
Boys	200	102.90	91.85
Girls	200	103.78	93.65

To determine whether the above differences were significant the critical ratios were computed and appear in Table V.

TABLE V

SIGNIFICANCE OF DIFFERENCES OF MEAN SCORES IN INTELLIGENCE AND READING OF GRADE VII BOYS AND GIRLS

Scores	D	SE_D	CR
Total I.Q.	0.88	1.37	0.64
Total Reading	1.80	1.71	1.05

The critical ratio of the 0.64 for Total I.Q. and 1.05 for Total Reading are found to be non-significant. It would appear that no significant difference exists between the sexes in intelligence or reading achievement at the grade seven level.

Assuming that the size of the boys' and girls' samples is large enough to ensure the reliability of the means of boths tests, the factor of variability of the measures about the mean must be considered. A comparison of the standard deviations computed for both tests appear in Table VI.

TABLE VI

COMPARISON OF STANDARD DEVIATION FOR BOYS AND GIRLS

	N	Total I.Q.	Total Reading
Boys	200	14.53	18.24
Girls	200	12.88	15.82

A critical ratio of 1.70 was obtained when the significance of the difference between standard deviations of total intelligence scores of boys and girls was tested. As this value is not great enough to indicate a significant difference the means may be accepted as stated. A computed critical ratio of 2.00 is significant at the .05 level for existing differences in Total Reading. To further test the significance of the difference between means when the variances are not homogeneous the approximate method described by Johnson[10] was applied. A critical ratio of 1.05 was computed, which is not significant at the .05 level. This finding would seem to reaffirm the validity of the computed means as measures of central tendency despite the presence of heterogeneity among the variance. The conclusion that no significant difference exists between boys' and girls' total reading scores at the grade VII level may be safely retained.

Bilingualism

Bilingualism has been recognized as a factor in the measurement of scholastic achievement. Various studies undertaken in Alberta offer evidence that bilingual pupils suffer a handicap when tested by verbal tests in English. Language studies indicate that the bilingual factor decreases in importance as a pupil proceeds from grade I to grade XII. In view of this observation the grade VII sample was chosen for study because of its intermediate position.

A random sample of 200 pupils who listed English as the preferred language was selected from the grade VII population. It was found that of the 917 grade VII candidates only 131 listed a language other than English as the preferred language spoken in the home. A comparison of the mean Total I.Q. scores and the mean Total Reading scores for these two groups appears in Table VII.

TABLE VII
COMPARISON OF MEAN TOTAL I.Q. SCORES AND TOTAL READING SCORES FOR MONOGLOT AND BILINGUAL SAMPLES

Samples	N	Total I. Q.	Total Reading
Monoglot	200	105.10	95.35
Bilingual	131	95.44	83.75

A difference between the means of intelligence scores was found to be 9.66. To determine the significance of the mean difference the critical ratio was computed.

[10]Palmer O. Johnson, **Statistical Methods in Research**, pp. 74-5.

TABLE VIII

SIGNIFICANCE OF DIFFERENCE OF TOTAL I.Q. MEAN SCORES OF MONOGLOT AND BILINGUAL PUPILS

Scores	D	SE_D	CR
Total I.Q.	9.66	1.45	6.66

The critical ratio of 6.66 is significant at the .01 level of confidence.

In reading achievement the monoglot sample manifests a superiority of 11.60 over the bilingual group. In order to test the significance of this difference the critical ratio was computed and appears below.

TABLE IX

SIGNIFICANCE OF DIFFERENCE OF MEAN TOTAL READING SCORES FOR MONOGLOT AND BILINGUAL SAMPLES

Scores	D	SE_D	CR
Total Reading	11.60	1.92	6.04

A critical ratio of 6.04 is found to be significant at the .01 level.

In order to determine whether the variability factors affected the reliability of the computed means of the Total I.Q. scores and the Total Reading scores, the significance of the differences of standard deviations was computed. The results are summarized in Table X.

TABLE X

SIGNIFICANCE OF DIFFERENCE OF STANDARD DEVIATIONS FOR TOTAL I.Q. AND TOTAL READING SCORES OBTAINED BY MONOGLOT AND BILINGUAL PUPILS

Scores	D	SE_D	CR
Total I. Q.	0.43	1.03	0.42
Total Reading	2.48	1.35	1.84

A critical ratio of 0.42 for Total I.Q. and 1.84 for Total Reading are found to be non-significant. It would appear that variability does not affect the reliability of the computed mean scores.

The findings of this study would indicate that the pupil with a bilingual background is more difficult to measure in terms of I.Q. scores of an English group intelligence test. The bilingual pupil fails to achieve comparable scores in a test of reading achievement.

Reading Achievement and Grade Placement

To determine the status of reading achievement in the province the data for each subsample, as found by Carmichael[11], were combined and the equivalent grade scores computed. A summary of these findings appears in Table XI.

TABLE XI

COMBINED MEANS, STANDARD DEVIATIONS AND CORRESPONDING GRADE SCORES OF ALBERTA READING SCORES

Test	Grade	M	SD_M	Grade Score in years	Average Yearly Increment
Reading Vocabulary Total	IV	68.7	12.15	5.2	1.06
	VII	57.03	11.64	7.9	1.0
Reading Comprehension Total	IV	25.17	6.16	5.4	1.1
	VII	34.65	7.61	7.8	.99
Total Reading	IV	93.90	15.91	5.3	1.08
	VII	91.61	18.19	7.9	1.0

Observation of the data for the grade IV sample indicates that achievement is somewhat superior to the normal for the grade placement of the ninth month in grade IV. Grade VII achievement would seem to be quite normal except for a slight inferiority in reading comprehension. Yearly progress in reading would appear to be quite normal. Gains in achievement from grade IV to grade VII are shown in Table XII.

The gain in terms of grade score in each of the sections of the test is less than three years. It would appear that a deceleration in reading achievement takes place from grade IV to grade VII.

11Anne Carmichael, **A Survery of the Achievement of Alberta School Children in Reading.**

TABLE XII

GROWTH IN READING ACHIEVEMENT IN TERMS OF GRADE PLACEMENT FROM GRADE FOUR TO GRADE SEVEN

Reading	Grade IV	Grade VII	Growth
Vocabulary	5.2	7.9	2.7
Comprehension	5.4	7.8	2.4
Total Reading	5.3	7.9	2.6

Conclusions

The purpose of this survey was to organize a body of data sufficient to make observations regarding reading achievement of Alberta pupils in regard to intelligence, sex, bilingualism and grade placement. A summary of conclusions follows.

1. A significant relationship between reading achievement and intelligence exists. High positive correlations of from .67 to .81 were obtained when pupils' abilities were compared, using scores on the California Short-Form Test of Mental Maturity and the California Reading Test, Intermediate, Form AA.

2. Examination of the relationship between intelligence and reading achievement indicates that factors are present which produce significant differences between certain of the coefficients of correlation. Correlation coefficients for the large urban sample were significantly greater than those of the small urban, the graded rural, or the ungraded rural samples.

3. Measurement by the California Short-Form Test of Mental Maturity reveals no significant sex differences in intelligence of Alberta children.

4. No significant sex differences in reading achievement of Alberta pupils at the grade VII level exist when measurement is made by the California Reading Test, Intermediate, Form AA.

5. In the measurement of reading achievement of boys and girls significant differences in variability do not limit the reliability of the computed mean scores.

6. Children from homes in which English was the preferred language were found to score significantly higher on tests of intelligence than those from bilingual homes.

7. A comparison of English and Bilingual samples for reading achievement favors the pupils from monoglot homes in which English is the language spoken.

8. Reading achievement for the Alberta grade IV sample is superior to the norms of the California Reading Test, Form AA, in terms of grade scores.

9. The Alberta grade VII sample equalled the reading achievement that might be expected in terms of grade score norms of the California Reading Test.

10. On the basis of a naive examination of grade scores of Alberta pupils, a deceleration in growth of reading ability is indicated between grades IV and VII.

Implications

1. The high correlation between intelligence and reading achievement indicates the presence of a common factor of language. Pupils with reading or language disabilities suffer a disadvantage in such measurement. A non-verbal or performance intelligence test might be used to supplement results of verbal intelligence tests of the reading deviate or of the bilingual pupil.

2. Measures of mental maturity may serve as a guide to the reading potential of a student.

3. As no significant differences in reading achievement were found between boys and girls, comparable achievement should be expected in the classroom. Further research in the fields of interest, motivation and subject matter might reveal sex differences of importance for instructional procedures.

4. Since bilingual children suffer a very definite handicap in reading, a program of remedial reading appears to be needed. The problem of bilingualism and scholastic achievement requires further study.

5. Research is needed to determine the causes of the apparent deceleration in reading growth between grades IV and VII.

BIBLIOGRAPHY

Anderson, Irving H. and Dearborn, Walter F. *The Psychology of Teaching Reading.* New York, The Ronald Press, 1952.

Carmichael, Anne. *A Survey of the Achievement of Alberta School Children in Reading.* Unpublished Master's thesis, The University of Alberta, 1954.

Cattell, Raymond B. "Review of California Short-Form Test of Mental Maturity." *The Nineteen Forty Mental Measurements Yearbook.* Highland Park, N. J., Rutgers University Press, 1940.

Dolch, Edward W. *The Psychology and Teaching of Reading.* New York; Ginn and Company, 1931.

Flanagan, J. C. *The Fourth Mental Measurement Yearbook.* Highland Park, N.J., The Gryphon Press, 1953.

Garrett, Henry G. *The Third Mental Measurements Yearbook,* 1941.

Johnson, Palmer O. *Statistical Methods in Research.* New York, Prentice-Hall, 1949.

Stroud, J. B. and Lindquist, E. F. "Sex Differences in Achievement in the Elementary and Secondary Schools." *Journal of Educational Psychology* XXXIII (1942), pp. 657-667.

Witty, Paul A. *Third Mental Measurements Yearbook,* 1941.

A CRITICAL EVALUATION OF THE DETROIT BEGINNING FIRST GRADE INTELLIGENCE TEST

FREDERICK POWELL
Dewberry, Alberta

An intelligence test is a measuring instrument. Like every measuring instrument it may have flaws in its structure due to theoretical misconceptions or it may be subject to errors of administration that detract from its usefulness.[1]

In the evaluation of any psychometric instrument, four properties must receive consideration. These are objectivity, reliability, validity, and standardization of the test or test battery. This study undertakes to present an evaluation of the Detroit Beginning First Grade Intelligence Test in the above terms.

Validity

The validity of a test may be determined by the use of an external criterion and by the criterion of internal consistency. When an external criterion is used, two groups known to differ with respect to the properties being measured are tested, and the performance of each group on each item is determined. The test will be deemed valid if it shows a satisfactory degree of discrimination between the two groups. This was presumably the method used by the authors of the Detroit Beginning First Grade Intelligence Test in the validation procedure described in the test manual. Here a correlation of .76 is reported between the Stanford-Binet mental ages and the weighted scores of 116 first-grade children. During the process of analyzing a sample of 1,838 Detroit Beginning First Grade Intelligence Test scores from the Edmonton public school system of 1948 there were found 159 cases of beginners who had taken both the Detroit Beginning First Grade Intelligence Test and the Kuhlmann-Anderson[2] group intelligence test of the appropriate level. The correlation of the Detroit Beginning and the Kuhlmann-Anderson was found to be .54.

In practice it is not always easy to find clear-cut criterion groups differing only in the experimental variable, so an internal criterion is often used. In using the criterion of internal consistency we may set up the extreme portions of a group who have taken a test as

---

[1]Anna M. Engel and Harry J. Baker, Detroit Beginning First Grade Intelligence Test (Revised).

[2]F. Kuhlmann and R. G. Anderson, Kuhlmann-Anderson Intelligence Tests (Fifth Edition).

criterion groups. In Lawshe's[3] method the highest and lowest 25 per cent are used. In Flanagan's[4] and in Davis's[5] method the highest and lowest 27 per cent are used.

The percentage of successes in the upper and in the lower 27 per cent of a sample of 250 cases from the Vermilion S.D. No. 25 for the year 1951 were computed and are given in Table I. Discrimination indices as computed by the above three methods are given in Table II.

TABLE I

PERCENTAGE OF SUCCESS IN UPPER AND LOWER TWENTY-SEVEN PER CENT OF VERMILION SAMPLE

Item	Per Cent High	Per Cent Low	Item	Per Cent High	Per Cent Low
I 1	94.1	84.8	VI 1	100.0	70.0
2	100.0	84.8	2	100.0	66.2
3	97.0	79.4	3	98.5	55.5
4	64.7	44.1	4	91.1	32.3
			5	75.0	36.8
II 1	100.0	92.6	6	60.3	8.8
2	98.5	83.8	7	69.1	23.5
3	88.2	51.5			
4	94.1	48.5	VII 1	95.6	60.3
5	91.1	58.5	2	94.1	39.2
6	89.4	44.1	3	98.5	55.9
7	64.7	25.2	4	91.1	17.6
			5	97.0	41.2
III 1	98.5	61.7	6	57.3	1.5
2	97.0	66.2	7	85.3	7.4
3	98.5	50.0			
4	98.5	52.9	VIII 1	97.0	73.5
5	77.9	22.1	2	98.5	61.7
6	95.6	41.2	3	94.1	38.2
7	91.1	33.8	4	77.9	17.6
			5	58.8	4.4
IV 1	98.5	85.3			
2	98.5	77.9	IX 1	100.0	63.2
3	100.0	75.0	2	92.6	29.4
4	95.6	61.7	3	76.4	26.5
5	98.5	29.4	4	61.7	10.3
6	97.0	45.6			
7	76.4	11.8	X 1	100.0	95.6
			2	100.0	85.3
V 1	100.0	100.0	3	91.1	48.5
2	98.5	95.6	4	98.5	51.5
3	98.5	94.1	5	83.8	25.0
4	97.0	85.3			
5	100.0	61.7			
6	98.5	69.1			
7	95.6	88.2			

[3]Charles H. Lawshe, **Principles of Personnel Testing**, pp. 177-191.
[4]J. C. Flanagan, "General Considerations in the Selection of Test Items", **Journal of Educational Psychology XXX** (December, 1939), pp. 674-680.
[5]Frederick B. Davies, **Item-Analysis Data**, pp. 8-15.

TABLE II

DISCRIMINATION VALUES OF ITEMS IN DETROIT BEGINNING FIRST GRADE INTELLIGENCE TEST

Item	D_F	D_L	D_D	Item	D_F	D_L	D_D
I 1	.20	.5	14	VI 1	.70	1.9	44
2	.55	1.3	32	2	.73	2.0	47
3	.40	1.2	36	3	.74	2.1	52
4	.23	.5	13	4	.63	1.8	44
				5	.40	1.0	25
II 1	.35	.9	22	6	.60	1.6	38
2	.50	1.2	37	7	.46	1.0	29
3	.45	1.1	28				
4	.55	1.6	38	VII 1	.60	1.5	37
5	.45	1.1	27	2	.62	1.9	45
6	.53	1.3	33	3	.68	2.0	52
7	.42	1.1	27	4	.73	2.1	53
				5	.67	2.1	52
III 1	.70	2.0	43	6	.75	2.3	38
2	.55	1.4	31	7	.77	2.6	59
3	.70	2.2	55				
4	.70	2.1	54	VIII 1	.45	1.2	30
5	.55	1.5	38	2	.65	1.9	49
6	.65	2.2	55	3	.64	1.9	46
7	.62	1.8	43	4	.60	1.7	42
				5	.68	2.0	48
IV 1	.50	1.3	31				
2	.55	1.5	37	IX 1	.72	2.1	49
3	.65	1.7	40	2	.68	2.0	50
4	.55	1.5	40	3	.52	1.3	35
5	.80	2.9	68	4	.56	1.6	39
6	.68	2.0	54				
7	.66	1.9	48	X 1	.30	.7	14
				2	.50	1.5	31
V 1	.00	0.0	0	3	.51	1.4	33
2	.20	.5	14	4	.76	2.2	64
3	.30	.6	19	5	.59	1.7	41
4	.35	.9	28				
5	.75	2.0	49				
6	.65	1.7	44				
7	.25	.5	21				

The index of discrimination in column D_F has been computed by the Flanagan method, that in column D_L by the Lawshe method, and that in column D_D by the Davis method.

Only one item, V 1, shows zero index of discrimination. All the others are positive. All three methods, then, show that the items in the Detroit Beginning First Grade Intelligence Test do discriminate between the higher and lower levels of ability. If a greater degree of discrimination were desired the procedure would be to remove items of low discrimination from the test and add others of a higher index value.

The three methods used in this item analysis were compared by means of the rank correlation coefficient, which is an appropriate statistic where the ranking or relative order of scores is important. The correlation of the ranking of the discriminatory power of the items by Flanagan's method vs. Lawshe's method was computed to be .98, of Lawshe's vs. Davis's. 98, and of Flanagan's vs Davis's .99.

It would, therefore, appear that the Detroit Beginning First Grade Intelligence Test has been carefully constructed in terms of the discriminatory power of the items, and is in this respect a valid test. Fifty-nine of the sixty items discriminate effectively between the children scoring highest and lowest on the total test.

Reliability

The consistency with which a test measures is indicated by its reliability coefficient. There are three types of reliability coefficient: first, the coefficient of equivalence, which indicates how much scores fluctuate from form to form of the same test; second, the coefficient of stability, which measures the extent of fluctuations on the same questions from one time to another, third, the coefficient of stability and equivalence which takes into account both the time-to-time variations and the form-to-form variations in test performance.

In the derivation of the coefficient of stability the same test is given after an interval of time to the same group and the results correlated. The manual of the Detroit Beginning First Grade Intelligence Test cites a reliability coefficient of .76 based on a retest of 407 cases after a four month interval.

In a case such as the Detroit Beginning First Grade Intelligence Test where there is no alternative form the coefficient of equivalence may be estimated by the split-half method or by the Kuder-Richardson formula. The split-half technique was used to derive a reliability coefficient from the unweighted scores of a sample of 65 cases comprising the entire beginning first grade class from the town of Vermilion in the fall of 1951. The result was a reliability coefficient of .89 when corrected by the Spearman-Brown formula. The split-half method was used by the authors to derive a reliability coefficient from the administration of the test to an unselected group of 116 first grade children using weighted scores. The result was a reliability coefficient of .91 when corrected by the Spearman-Brown formula.

Using the item analysis date for the 250 cases of the Vermilion distribution, a reliability coefficient may be derived using the Kuder-Richardson formula. In this formula, $r = \frac{n}{n-1}\left(\frac{1-pq}{s^2}\right)$,

n is 60, s is 10.2 and the sum of pq is 9.784. Substituting in the formula we get a reliability coefficient of .91.

The closeness of correspondence between these different coefficients of reliability would indicate that the chance score on this tests is not considerable. The probability of a pure chance score on this test has not been computed, but quick examination of the nature of the items will reveal why it cannot be high. This is the multiple response required for many items, which reduces the probability of guessing the correct answer.

Standardization

The revised norms for the Detroit Beginning First Grade Intelligence Test for the year 1945 were computed from the weighted scores of 37,996 first grade pupils. Some effort was made during the progress of this study to investigate the averages of a much smaller sample of 4,402 Alberta school children. These averages are given in Table III with the standard deviations and Pearson's coefficient of skewness.

TABLE III

STATISTICAL ANALYSIS OF DETROIT BEGINNING FIRST GRADE INTELLIGENCE TEST SCORES FROM THE SCHOOL SYSTEMS OF EDMONTON, WESTLOCK, AND VERMILION

School System	Year	N	Mean Age in Months	S.D. Of Age	Mean Score	S.D. Of Score	Skewness (Pearson)
Edmonton	1948	1838	73.44	4.07	62.28	18.44	—.53
Edmonton	1949	2144	73.82	4.32	63.71	18.00	—.46
Westlock	1950	170	76.09	6.59	64.80	17.05	—.78
Vermilion	1951	250	75.83	5.14	66.62	18.55	—.56
Combined		4402	73.87	4.52	63.32	18.20	—.48

It might seem worth while to develop local norms on the basis of this total sample of 4,402 and to compare them with the Detroit norms, but there are difficulties in the way of accomplishing this—one of which is apparent in the table, and one which is not. An examination of Table III will reveal that all the separate distributions of scores and the total distribution are skewed. A second important fact about these distributions is that they are select rather than random samples, composed of the children who begin school about the age of six years and two months. Evidence to this effect is

found in Table IV. The mean scores was computed for each month in the range where there were sufficient cases to provide an adequate sample.

TABLE IV

MEAN SCORES FOR EACH MONTH OF CHRONOLOGICAL AGE FOR AGES FROM 66 TO 84 MONTHS

Age	N	Mean Score	Age	N	Mean Score
66	39	58.2	76	381	66.5
67	197	54.5	77	350	67.8
68	223	58.0	78	278	69.1
69	287	57.2	79	168	67.4
70	340	60.4	80	136	66.8
71	404	58.4	81	81	63.0
72	352	62.8	82	43	65.3
73	330	62.8	83	38	72.4
74	350	66.4	84	21	60.3
75	322	66.1	.....	.....	.....

The 4,320 cases in the above table are from the school systems of Edmonton, Vermilion, and Westlock. It will be noted that there is a fairly uniform trend toward increase in score with increase in chronological age from 66 months to 78 months. After the age of 78 months the scores begin to decline and to scatter. This must be due to a selective factor in the population under study: it cannot be due to an educational factor, since all cases are beginners. It is this selective factor which vitiates the sample for the derivation of norms. The most obvious explanation of the decline in score of the higher age groups is that the latter cases in the sample are a more slowly maturing group who have been kept in the home by the parents till they develop sufficiently to cope with the intellectual work of the school. For the group from ages 78 to 84 months the correlation between age and score is —.37, showing a decrease in performance with increase in chronological age.

The statistics computed for the distributions in Table III are essential for the understanding of a distribution of scores. Nevertheless there are important questions which may not be answered from an isolated study of these statistics. The Detroit is a beginner's test, but is its range of difficulty well adjusted to the capabilities of the age group who take the test in Alberta schools?

Evidence was obtained from an analysis of the item difficulty for the Vermilion sample that the range of difficulty of the items is less than the theoretical maximum. This evidence will now be reviewed.

TABLE V

PERCENTAGE OF CORRECT RESPONSES WITH CORRESPONDING SIGMA SCORES FROM AN ARBITRARY ZERO VALUE OF —3 COMPUTED FROM VERMILION SAMPLE

Item	Per Cent Correct	Sigma Score	Item	Per Cent Correct	Sigma Score
I 1	90.8	1.67	VI 1	88.4	1.99
2	91.2	1.65	2	90.0	1.72
3	89.6	1.74	3	80.4	1.69
4	54.4	2.89	4	65.6	2.60
			5	55.2	2.87
II 1	96.4	1.20	6	36.0	3.36
2	89.6	1.74	7	42.0	2.80
3	66.4	2.58			
4	72.0	2.42	VII 1	80.0	2.16
5	76.0	2.29	2	69.2	2.50
6	64.4	2.63	3	76.8	2.27
7	46.0	3.10	4	61.2	2.72
			5	74.8	2.33
III 1	86.8	1.88	6	24.8	3.67
2	82.2	2.08	7	47.6	3.08
3	84.0	2.01			
4	82.0	2.08	VIII 1	88.4	1.80
5	53.2	2.92	2	86.0	1.92
6	76.8	2.29	3	72.8	2.39
7	61.2	2.72	4	45.2	3.12
			5	27.2	3.61
IV 1	95.6	1.29			
2	91.2	1.65	IX 1	86.0	1.92
3	91.2	1.65	2	63.6	2.65
4	82.4	2.07	3	53.2	2.66
5	65.6	2.60	4	27.2	3.61
6	74.0	2.36			
7	40.0	3.25	X 1	96.8	1.15
			2	93.6	1.48
V 1	100.0	0.00	3	66.6	2.58
2	97.6	1.02	4	72.0	2.42
3	96.0	1.25	5	50.4	2.99
4	94.4	1.41			
5	82.4	2.07			
6	84.4	1.80			
7	93.6	1.48			

Is the Detroit Beginning First Grade Intelligence Test too easy for the age group to which it is being administered in Alberta?

The number and percentages of correct responses were computed for the sample of 250 cases from the Vermilion S.D. No. 25 for

September 1951. These percentages are given in Table V. Also in this table are given the sigma scores which correspond to these percentages for a normal distribution.

The range of mental ages on the Detroit norms is from 42 months to 110 months, or a spread of 68 months. Using a normal distribution, the location of an individual on this scale should be determined by no more than six S.D. units of scores. The Detroit Beginning First Grade Intelligence scale has a range of 102 months. If the distribution of scores is normal the mean must be at the mid-point of the range of scores, or 51. With a mean of 66.62 and a standard deviation of 18.55 it will be seen that the mean of the Vermilion distribution is .84 sigma above the mid-point of the range of Detroit weighted scores. With a range of 102 and a S.D. of 18.55 there will be 5.5 sigma units in the scale of months of mental age. Each sigma unit will then correspond to 12.5 months of mental age. A score of .84 sigma will correspond to 10.4 months of mental age. This test is then approximately 10.4 months too easy for the best placing of the test if a normal distribution is to be expected.

Do the Detroit norms yield an I.Q. that is too high?

This further question has a bearing on the absolute value of the I.Q. computed from the Detroit norms. Is the I.Q. above or below the mean of 100 of a normal population? The evidence supports the contention that the Detroit norms yield an I.Q. that is too high.

A sample of 3,512 Detroit Beginning First Grade Intelligence Test I.Q. scores was analyzed. The frequency distribution of these I. Q. scores is given in Table VI.

The mean age of this sample was found to be six years and 3.19 months, with a standard deviation of 5.57 months. The mean weighted score was 64.53, with a standard deviation of 18.07. Both the distributions of ages and scores are skewed, positively for ages and negatively for scores. Using Pearson's coefficient, the skewness of the distribution of ages was found to be .67 and the skewness of the distribution of scores was found to be —.54.

The range of the I.Q. scores was from 46 to 157. The mean I.Q. was computed to be 108.18 with a standard deviation of 16.45. The median was computed to be 109.09. Pearson's coefficient of skewness was computed to be —.17.

General practice in intelligence testing has sanctioned the arbitrary assumption of a mean I.Q. of 100 in the population, with the obvious theoretical corollary that fifty per cent will fall above and below this figure. The distribution of Detroit I.Q.'s departs grossly from the widely accepted hypothetical distribution. On

the basis of this sample of 3,512 cases the distribution of Detroit I.Q.'s has only 30% of the cases below I.Q. 100.

TABLE VI
FREQUENCY DISTRIBUTION OF I.Q. SCORES OF EDMONTON SAMPLE

Mid-Point	Frequency	Mid-Point	Frequency
157	4	97	219
152	5	92	300
147	26	87	228
142	48	82	116
137	91	77	53
132	149	72	32
127	230	67	22
122	314	62	12
117	393	57	7
112	465	52	5
107	380	47	1
102	412	.....	.....
			3512

It is not only from the concept of bisymmetry of the distribution of I.Q.'s about a mean of 100 that the Detroit distribution of I.Q.'s departs. Table VII gives a comparison of the distribution of Detroit I.Q.'s with the classification of David Wechsler.[6]. The chi-square test is applied with 7-1 *df*, and the null hypothesis is that there is no discrepancy of fit between the observed and theoretical distributions. The largest chi-square value in the tables of Fisher and Yates[7] is 16.81 at the .01 level with 6 df. Since the obtained χ^2 is enormously larger than this, the null hypothesis is rejected. In point of fact the disagreement is gross in every category, including both extremities of the distribution.

It may be argued that Wechsler's distribution is applicable only to adults, but as Wechsler notes, the difference between his classification and that of Terman is numerically small, and Terman's classification is applicable to children.[8]

[8]L. M. Terman and M. A. Merrill, **Measuring Inteligence**, p. 33-51.
[7]Fisher and Yates, **Statistical Tables**, p. 41.
[6]David Wechsler, **The Measurement of Adult Intelligence**, pp. 36-42.

Table VII

COMPARISON OF DISTRIBUTION OF DETROIT I.Q.'s WITH CLASSIFICATION OF DAVID WECHSLER

I.Q. Limits	Per Cent Wechsler	Per Cent Detroit	Frequency Wechsler	Frequency Detroit	$f_o - f_t$	$(f_o - f_t)^2$	$\frac{(f_o - f_t)^2}{f_t}$
128 and over	2.2	12.47	78	438	360	129600	1661.54
120-127	6.7	13.33	235	468	233	54289	231.02
111-119	16.1	21.98	565	727	207	42849	75.84
91-110	50.0	37.81	1756	1328	—428	183184	104.32
80- 90	16.1	10.97	565	379	—186	34596	61.23
66- 79	6.7	2.85	235	100	—135	18225	77.55
65 and under	2.2	.77	78	27	— 51	2601	33.35
							χ^2 2244.85

There is one further bit of evidence that the Detroit yields an I.Q. that is too high. The Detroit Beginning First Grade Intelligence Test was administered as a retest to a small sample of 17 cases from rural schools in the Vermilion S.D. No. 25, six months after the beginning of school. The mean I.Q. was computed to be 110.65 with a standard deviation of 14.99. Also six months after the beginning of school the Stanford-Binet Individual Intelligence Examination, Form L, was administered to the same groups. The mean I.Q. from this test was computed to be 97.71 with a standard deviation of 10.12. It is also possible that the mean I.Q. of 108.18 from the 1953 Edmonton sample is higher than would have been obtained had the I.Q.'s been estimated using the Stanford Binet.

Conclusions

Two conclusions have been well established in this study. One is that the Detroit Beginning First Grade Intelligence Test is a valid test in the sense that the items on the test really discriminate the levels of intellectual ability. The second is that the Detroit Beginning First Grade Intelligence Test is a reliable test. Two additional conclusions have been arrived at which require further research and substantiation. First, the test is too easy for the age group to which it is being administered in Alberta; second, the I.Q.'s computed from the test are too high.

BIBLIOGRAPHY

Davis, Frederick B. *Item Analysis Data.* Cambridge, Graduate School of Education, Harvard University, 1944.

Engel, Anna M. and Baker, Harry J. *Detroit Beginning First-Grade Intelligence Test* (Revised). World Book Company.

Fisher, R. A. and Yates, F. *Statistical Tables.* London, Oliver and Boyd, 1953.

Flanagan, J. C. "General Considerations in the Selection of Test Items." *Journal of Educational Psychology* XXX (December, 1939).

Kuhlmann, F. and Anderson, R. G. *Kuhlmann-Anderson Intelligence Tests* Fifth Edition). Minneapolis, Educational Test Bureau.

Lawshe, Charles H. Jr. *Principles of Personnel Testing.* New York, McGraw-Hill Book Company Inc., 1948.

Terman, L. M. and Merrill, Maude A. *Measuring Intelligence.* Boston, Houghton Mifflin Company, 1937.

Wechsler, David. *The Measurement of Adult Intelligence.* Baltimore, Williams and Wilkins Company, 1944.

A SURVEY OF THE ARITHMETICAL ACHIEVEMENT OF GRADE FIVE PUPILS IN ALBERTA SCHOOLS*

RALPH O. PRITCHARD
Principal, Allendale Elementary School, Edmonton

Purpose of the Study

The investigation described herein was designed and carried out for the purpose of determining the status of grade V arithmetic in Alberta schools. It attempted to find answers to the following questions: (1) Is there equality of achievement in arithmetic among the grade V pupils of urban, town, graded rural, and ungraded rural schools in Alberta? (2) Does the achievement in arithmetic of Alberta grade V pupils compare favorably with that of similar pupils in other parts of the country? (3) Are there any significant differences between the arithmetical achievement of boys and of girls in the grade V classes of Alberta schools

It was felt that the answers to these questions might supplement the findings of Carmichael and Rees[1], Read and Conquest[2], Coutts and Baker[3], and complement those of Climenhaga[4].

Selection of the Sample

Representatives of the Faculty Committee on Educational Research of University of Alberta, working with the writer, decided that for the purposes of the survey one thousand grade V pupils randomly chosen from four types of Alberta schools would constitute a suitable sample. A description of each type follows : (1) *urban*—those found in the cities of the province; (2) *town*—those located in the independent towns as listed in the 1953 Annual Report of the Department of Education (no town in which fewer than 200 pupils were enrolled was considered); (3) *graded rural*—centralized divisional schools at which at least three hundred children from farm homes were in attendance; (4) *ungraded rural*—rural schools having one teacher only. The random sampling procedures used resulted in the selection of 975 pupils as follows: urban, 354; town, 222; graded rural, 208; ungraded rural, 191.

---

*This study sponsored by the Alberta Committee on Educational Research.

1Anne Carmichael and Robert E. Rees, "A Survey of Reading Achievement in Alberta Schools", **The Alberta Journal of Educational Research** (March, 1955), pp. 18-33.

2T. James Reid and George R. Conquest, "A Survey of the Language Achievement of Alberta School Children", **The Alberta Journal of Educational Research** (June, 1955), pp. 39-52.

3H. T. Coutts and H. S. Baker, "A Study of the Written Composition of a Representative Sample of Alberta Grade Four and Grade Seven Pupils", **The Alberta Journal of Educational Research** (June, 1955), pp. 5-18.

4Clarence E. Climenhaga, "A Survey of the Arithmetical Achievement of Grade Eight Pupils in Alberta Schools", **The Alberta Journal of Educational Research** (December, 1955), pp. 35-47.

The Testing Instruments

Through the kind co-operation of the Department of Education, school superintendents, principals, and teachers in the schools concerned, copies of the tests used and of the "Personal Data Sheet" were distributed to each pupil in the sample. The tests were (1) The Otis Quick-Scoring Mental Ability Test, Beta, Form Cm for Grades IV to IX, and (2) The Iowa Every-Pupil Tests of Basic Skills, New Edition, Test D: Basic Arithmetic Skills, Form O, Advanced Battery, for grades IV to IX. The Otis test appears to meet the criterion of usefulness required for this survey. It is not too long; it may be administered by persons lacking special training in testing; scoring is not difficult; the cost is reasonable; and its degree of reliability and validity makes it a suitable instrument for measuring brightness, or for predicting the probable rate of a pupil's progress through school.

The Iowa Test D: Basic Arithmetic Skills, is divided into three sections—Part I, Vocabulary and Fundamental Knowledge; Part II, Whole Numbers and Fractions, Percentages and Decimals; Part III, Problems. The directions for administering are clear and concise, administration time is not unduly long, and graphic representations of the results are suitably symmetrical.

Otis Intelligence Test Results

A comparison of the Otis Intelligence Quotients gave the following results: the urban sample is shown to be superior to the graded rural, town, and ungraded rural samples; the graded rural sample is superior to the town and ungraded rural samples; the town sample may be slightly superior to the ungraded rural sample. The differences are statistically significant. These findings are summarized in Table I below.

Reasons for the differences in intelligence are difficult to determine. The author of the Otis test states, in part, ". . . any test which involves the use of language can measure mental ability only to the extent to which we may assume that pupils of the same age may have had approximately the same opportunity to learn."[5] T. J. Reid, after a study of current writings on the subject, was able to state with confidence, ". . . there is . . . adequate evidence to suggest that children of foreign parentage suffer a definite handicap in English language achievement."[6]

---

[5]Arthur S. Otis, **Manual of Directions for Beta Test, p. 1.**

[6]T. J. Read, **A Survey of the Language Achievement of Alberta School Children in Relation to Bilingualism, Sex and Intelligence' p. 19.**

TABLE I

COMPARISON OF THE MEAN OTIS INTELLIGENCE SCORES OBTAINED BY FOUR SAMPLES OF GRADE FIVE PUPILS

Sample	Mean	Difference of Means
Urban	105.74	.....
Town	98.33	7.41
Urban	105.74	.....
Graded Rural	102.69	3.05
Urban	105.74	.....
Ungraded Rural	95.85	9.89
Town	98.33	.....
Graded Rural	102.69	4.36
Town	98.33	.....
Ungraded Rural	95.85	2.48
Graded Rural	102.69	.....
Ungraded Rural	95.85	6.84

A check of the subsamples of the present study revealed that 7.4 per cent of the urban sample, 29.4 per cent of the town sample, 18.2 per cent of the graded rural sample, and 13.5 per cent of the ungraded rural sample indicated that the language of their homes was other than English.

Iowa Total Test Results

The first stage of the investigation of arithmetical achievement was a study of the total scores of the three parts of the Iowa test. The mean total scores of the four subsamples were compared. It was found that (1) the achievement of urban pupils was not significantly different from that of graded rural pupils; (2) the achievement of urban pupils was superior to that of town pupils and ungraded rural pupils; (3) the achievement of town pupils was superior to that of ungraded rural pupils; (4) the achievement of graded rural pupils surpassed that of town pupils and ungraded rural pupils. In order of superiority of achievement the four subsamples would rank thus; urban, graded rural, town, ungraded rural.

This corresponds with the rank order of the subsamples as determined by comparing the mean intelligence quotients.

The numerical comparison of the mean total scores in shown in Table II. The difference between the means of the subsample in pairs is indicated. The difference between urban and graded rural mean scores was not significant, but all other differences were significant at the .01 level.

TABLE II

COMPARISON OF THE MEAN TOTAL SCORES OBTAINED BY FOUR SAMPLES OF ALBERTA GRADE FIVE PUPILS ON THE IOWA TEST

Sample	Mean	Difference of Means	Sig.
Urban	32.29	.....	.....
Town	28.47	3.82	.01
Urban	32.29	.....	.....
Graded Rural	31.42	.87	.....
Urban	32.29	.....	.....
Ungraded Rural	26.05	6.24	.01
Town	28.47	.....	.....
Graded Rural	31.42	2.95	.01
Town	28.47	.....	.....
Ungraded Rural	26.05	2.42	.01
Graded Rural	31.42	.....	.....
Ungraded Rural	26.05	5.37	.01

The rank order of the subsamples, based on mean scores, was the same on Part I (Vocabulary and Fundamental Knowledge) as it was on the total test. However, on Part II (Whole Numbers, Fractions, Percentages, and Decimals), and on Part III (Problems), graded rural scores were slightly, but not significantly, higher than urban mean scores.

These findings make it possible to state with some degree of confidence that there is not equality of achievement in arithmetic among the grade V pupils in four types of Alberta schools.

Comparison of Alberta Median Scores with Iowa Median Scores

TABLE III

COMPARISON OF THE MEDIAN SCORES OF ALBERTA GRADE FIVE PUPILS ON THE IOWA TEST WITH MEDIAN SCORES OF THE IOWA STANDARDIZATION SAMPLE

Sample	Iowa Test	Alberta Median	Iowa Median	Dif.	Sig.
Composite (the total sample)	Total	29.21	30	.79	.....
	Part I	9.52	10.5	.98	.01
	Part II	9.86	11	1.14	.01
	Part III	9.97	9.5	*.47*	.01
Urban	Total	31.44	30	*1.44*	.....
	Part I	10.46	10.5	.04	.....
	Part II	10.28	11	.72	.01
	Part III	10.52	9.5	*1.02*	.01
Town	Total	27.99	30	2.01	.01
	Part I	8.65	10.5	1.85	.01
	Part II	9.33	11	1.67	.01
	Part III	9.99	9.5	*.49*	.....
Graded Rural	Total	29.50	30	.50	.....
	Part I	8.94	10.5	1.56	.01
	Part II	10.55	11	.45	.....
	Part III	10.57	9.5	*1.07*	.01
Ungraded Rural	Total	26.09	30	3.91	.01
	Part I	8.94	10.5	1.56	.01
	Part II	8.76	11	2.24	.01
	Part III	8.26	9.5	1.24	.01

NOTE: Alberta Median—the median scores of Alberta pupils on the Iowa test.
Iowa Median—the published median scores of the Iowa standardization sample.
Dif.—the difference between the Alberta median and the Iowa median. The italicized figures indicate that the difference favors the Alberta median.
Sig.—significance level.

Examination of Table III reveals that in the twenty comparisons made: (1) the Alberta medians were inferior to the standardization medians in eleven instances: (2) in six cases there were no significant median differences; and (3) in three cases, on Part III of the test, the Alberta medians were significantly superior to the standardization sample medians.

It should be noted that:

The schools involved in the Iowa program are located in communities that range in population from a few hundred to more than 200,000, the majority numbering between 1,000 and 50,000. All are graded public schools; non one-room rural schools are included.[7]

[7]Iowa Every-Pupil Tests. Manual of General Information 1947, p. 13.

The achievement of Alberta pupils as represented by the sample used in this investigation was inferior to that of the grade V pupils used in formulating the Iowa norms. This statement must be qualified by reference to the quotation immediately above.

Sex Differences

The findings relative to the arithmetical achievement of boys and girls may be stated as follows: on the basis of the results of the use of the Iowa Every-Pupil Test of Basic Arithmetic Skills, Form O, Advanced, with four samples of grade V pupils, (1) the girls in the ungraded rural sample were slightly, but not significantly superior to the boys; (2) the boys of the urban sample had significantly better mean scores that the girls in that sample; (3) except for the urban sample, there were no significant differences between the arithmetical achievement of the boys and the girls.

Conclusions

The Otis Quick-Scoring Test of Mental Ability, Beta, Form C, was administered to nearly one thousand grade V children from various types of Alberta schools. The mean intelligence quotient, as measured by this instrument, was found to be 101.47, with standard deviation of 1.49 and standard error of the mean .399. The four subsamples have been shown to belong, statistically, to the same homogeneous population. Significant differences exist between the mean intelligence scores of urban and rural children. The apparent superiority of the urban sample may be caused by a number of factors. City pupils may be more accustomed to the use of standardized tests, and their familiarity with test procedures may tend to raise their scores. One of the limitations of any group verbal test is that it cannot measure all of the factors which make up general intelligence. Thus, the pupil whose experiences have been more manual and manipulative than verbal may be unable to achieve as his urban counterpart on a verbal test. Selective migration may also contribute to the differences observed. The test results indicate that the probability of academic success of the child in a single-teacher school is somewhat less than that of a child in an urban school.

When the Iowa Every-Pupil Test of Basic Arithmetic Skills was used as a measuring instrument, the results indicated that there is not equality of achievement among the children of the four subsamples. Except for the difference between mean scores on the whole test of the urban and graded rural samples, the differences are all significantly large. Inequalities of arithmetical achievement as indicated may be due to inequalities of intellectual capabilities

and to inequalities of educational opportunity. Little difference exists between the means of urban and graded rural samples. Equality of educational opportunity may be indicated in this one instance.

Insofar as it is possible to make statistical comparisons of Alberta means with those of the standardization sample, it seems valid to draw the following conclusions:

(1) On the total Iowa test, Alberta medians did not differ significantly from the Iowa medians;

(2) The medians of the Alberta sample were somewhat lower than the Iowa medians on Parts I and II of the test, but were significantly higher on Part III;

(3) Medians of the ungraded rural sample were significantly inferior to those of the Iowa standardization sample in all sections of the test. (No pupils from rural schools were included in the standardization sample.)

The findings of this study respecting sex differences in arithmetical achievement are not at variance with those of other studies. The boys of the urban sample were significantly superior to the girls on mean total score and mean Part III score. They showed a tendency to be superior on Parts I and II. Otherwise, no significant differences between the arithmetical achievement of boys and girls were observed.

Recommendations

As a result of this survey, the writer makes the following recommendations:

1. There is need for a program to develop standardized Alberta tests, or to obtain Alberta norms for good achievement tests already available.
2. Every possible effort should be made to increase the supply of well qualified teachers for all of the classrooms of the province.
3. The policy of the Department of Education with respect to the centralization of the rural one-room schools should be continued.
4. The province-wide testing program of the Department of Educa- should be continued and expanded, and arrangements completed to make the results of the program readily available to eductionists.
5. Efforts should be directed toward making it possible for smaller centers of population to attract and hold well-trained teachers.

The writer believes that adoption of the recommendations cited would result in a reduction of the inequalities of educational opportunity which appear to exist among various types of Alberta schools.

BIBLIOGRAPHY

Carmichael, Anne and Rees, Robert E. "A Survey of Reading Achievements in Alberta Schools". *The Alberta Journal of Educational Research* I:1 (March, 1955), pp. 18-33.

Climenhaga, Clarence E. "A Survey of the Arithmetical Achivement of Grade Eight Pupils in Alberta Schools". *The Alberta Journal of Educational Research* I:4 (December, 1955), pp. 35-47.

Coutts, H. T. and Baker, H. S. "A Study of the Written Composition of a Representative Sample of Alberta Grade Four and Grade Seven Pupils". *The Alberta Journal of Educational Research* I:2 (June, 1955), pp. 5-18.

Iowa Every-Pupil Tests of Basic Skills. *Manual of General Information.* Boston, Hughton Mifflin Company, 1947.

Otis, Arthur S. *Manual of Directions for Beta Test.* Yonkers-on-Hudson, World Book Company, 1954.

Reid, T. J. *A Survey of the Language Achievement of Alberta School Children in Relation to Bilingualism, Sex, and Intelligence.* Unpublished Master's Thesis, the University of Alberta, 1954.

Reid, T. James and Conquest, George R. "A Survey of the Language Achievement of Alberta School Children". *The Alberta Journal of Educational Research* I:2 (June, 1955), pp. 39-52.

JACQUES MARITAIN: MAN AND EDUCATOR

EDWARD BLAKE COLL, C.S.B.
Principal, St. Mary's Boys' School, Calgary

Early Life and Education

The life and work of Jacques Maritain may be summed up as a continuous search for truth, for the meaning of reality. This search was not for himself alone but as well for those who might welcome the products of his labors. His refusal to be content with the currently accepted explanations of reality might have been taken as a sign of weakness, or of flight from the hard facts of life. On the contrary his dogged idealism was a sign of moral strength, demanding personal and professional sacrifices not willingly undertaken by most men.

Maritain was acquainted with those who, in his country, were dissatisfied with the products of rationalism, products adumbrated by his countrymen, Voltaire and Diderot. Men such as Beaudelaire, Psichari and Bloy had tried in various ways to find satisfaction of spirit in the material things of the world. Their failure spurred Maritain to seek in other directions. It cannot be alleged that Maritain was out of touch with the hard reality of thought common to the scientifically minded men of his day, since he himself was trained as a scientist. It was the very failure of science to answer his questions on reality that forced him to seek the answers in philosophy. He felt himself impelled to expose the data of science to the light of logical criticism.

Jacques Maritain was born in Paris in the year 1882, a descendant, on his mother's side, of a family prominent in political affairs and noted for fearlessness in the cause of righteousness. From his father he acquired an attitude of devotion to study, leisurely in the father's case, but urgent and crusading in his son.

His early education was gained at the Lycée Henri IV, where his friendship with Ernest Psichari, grandson of Ernest Renan, contributed greatly to the spiritual development of both young men. But neither the philosopsy courses at the Lycée, nor the more advanced courses at the Sorbonne, served to answer more than superficial questions. His inquiries were already metaphysical and eschatological.

His chance meeting with Raissa Oumansoff, his future wife, seemed almost providential, since she too had the same desire to know the meaning of the scientific materials with which they both worked. Her disillusionment seemed a confirmation of his own. The con-

clusion that existence without meaning was unendurable brought them to a contemplation of suicide.

The contact, through friends, with the philosopher Henri Bergson was the first ray of light to fall on this unhappy pair, the first promise that their search was not in vain. Even the faint prospect of attaining a knowledge of the absolute lightened their despair and sent them on the path to the final solution of their difficulties.

It must be admitted that their solution does not commend itself to all persons of intelligence and goodwill. For them, however, it was adequate and satisfying. It was, moreover, clearly not an emotional experience, but one of reason and logic. They were introduced to the writings of St. Thomas Aquinas.

For Maritain, the teachings of St. Thomas were the truths long sought. Penned in the thirteenth century, here were the answers to the doubts and questionings of any age. Obviously the teachings of St. Thomas must be brought into relationship with the intellectual and spiritual problems of the twentieth century. The finger of duty pointed directly to Maritain.

In 1930 Maritain became associated with the Institute of Medieval Studies in Toronto, Canada. During the Second World War he was visiting professor at Columbia University in New York, and later at Princeton University. After the war he returned to France and received the appointment of Ambassador to the Vatican, in which position he served from 1945 to 1948. He then occupied the chair of Philosophy at Princeton University, from which position he retired recently. He still continues to publish essays and articles relating present-day topics to Thomistic philosopsy.

Maritain's Philosophical Studies

Maritain early began to find flaws in the teachings of Bergson and turned more and more to those of St. Thomas. In these teachings he found the answers not only to his own personal problems but to those of many seekers similarly perplexed.

This challenge faced him, to spread the philosophy of St. Thomas, not as an historical curiosity, but as a working philosophy for modern life. He wanted first to know why this philosophy had so long lain in eclipse. A review of the history of philosophical thought from the period of the Scholastics to the modern times, discovered that Descartes had established a position of great influence on modern thought. In particular there was his notion of innate ideas, which are generated from outside the mind. This relegated the intellect to a role of introversion, to a consideration of ideas already existing within the mind and not, as St. Thomas teaches, to a role of extroversion, a consideration of the external truth of things. This

theory produced what Maritain calls the "angelism" of Descartes, leading men to reject the external world as irrelevant in matters of epistomology, and even of ontology itself. According to Maritain, this misdirection of thought led to a subjectivism masking the absoluteness of truth and the reality of existence. Hence the inevitable failure of his early instructors to answer his questions about the nature of reality. He considered it a duty to re-establish philosophy upon solid ground and to apply Thomistic principles to the problems of modern life.

Maritain maintains that the direct consequence of Descartes' "angelism" is the denial, or, at least, the neglect of the spiritual. This, to him, is a perversion of the true nature of being which can be corrected only by a proper understanding of the nature of man. He showed, according to Thomistic principles, that man is spiritual as well as material. The spiritual part of Man's being is the more important, especially in the attainment of truth, since it is through the operation of this spiritual part that contact is made with the reality of sensible things.

This ability to know individual truths and to be led to the knowledge of the absolute truth seems to Maritain to be the reason for the dignity of man and the solid basis for the respect which is owed him by his fellow men. For this reason, the rights guaranteed man by a democratic state have their origin in the very nature of man, a spiritual nature, capable of a knowledge of the absolute truth. Maritain considered this a lesson from Thomism which would be of value to the modern world since it would give a philosophical explanation of democratic ways of life.

Maritain's Theory of Education

Maritain was led from his study of the nature of man to a consideration of the problem of education since it dealt with the formation of man according to a definite ideal of what man should be. Maritain accepts the Thomistic view of the purpose of existence. He considers the end of life to be closely connected with the nature of man and his personality. His spiritual nature is the key to the direction which must be given the education of man. The real purpose of man's existence is union with the ultimate truth, attained by a knowledge of the intermediate truths which exist in reality. This final end of man is the goal of education, which prepared him for it.

If one accepts Maritain's first principles, his theory of education seems logical, preparing man step by step for the final knowledge of the ultimate truth. Maritain is firmly convinced of the validity of the Thomistic doctrine, as are those who accept these principles.

There are others in the field of educational philosophy who do not agree with him. Dewey, for example, would consider the very activity of man an end in itself, sufficient to justify and motivate man to act, without reference to a union with ultimate truth. This view seems to place the criterion of man's actions within himself, while Maritain would have it outside the individual. Dewey would stress the sensitive in man while Maritain would stress the role of the spiritual. This view leads Maritain to emphasize the personality of man which rests on the spiritual rather than the individuality which rests on the material. The development of the spiritual element of man will produce one who is aware of the destiny of mankind, and will develop the instrument by which this destiny can be achieved.

The Dynamics of Education

Maritain proceeds to consider the dynamics of education as producing the desired effect. He follows the Thomists in the explanation of the nature of knowledge, showing that the active intellect of the child is the important instrument in acquiring knowledge. It is the power of the intellect which is in contact with the reality of the object, though this contact is made through the senses. Thus the whole man is engaged in the process of learning, while the role of the teacher is one of encouragement and direction. This theory of learning is in harmony with that of the modern psychologists who stress the need of arousing interest in the student so that he himself may carry out the task of learning. Maritain points out the need of a teacher to create an atmosphere in which the learner can best operate, and speaks of the freedom of the learner as directed by discipline imposed by the teacher for the good of the learner.

Dispositions to be Fostered in the Pupil

Certain dispositions are to be fostered in the pupil: love of truth, love of justice and love of the good. The word love is used here in the sense of a desire for the object loved. Along with these dispositions, Maritain would have the teacher cultivate a feeling of happiness and an acceptance of the student's condition in life. The teacher must develop in the child a habit of work, not necessarily for the particular piece of work, but rather a sense of responsibility for the task undertaken and the need of carrying it through to a successful conclusion. In this he differs from Dewey who sees the responsibility arising from the very doing of the activity, while Maritain sees it existing in the nature of the person, arising from the spiritual desire for the perfection of the individual. Many modern writers claim to note a lack of this sense of responsibility in the students of today, explaining this lack in different ways, some

deploring the present-day attitude to work, others placing the cause of such an attitude in the modern home-life, the demands of society or the failing of the old-fashioned virtues.

Maritain also sees the necessity of fostering a feeling of co-operation among the students. This attitude meets the approval of modern authorities on education. While the more important agent in the process of learning is the pupil, Maritain does not underrate the place of the teacher in the process. He considers certain principles which must guide the teacher in this work. It is necessary that the teacher keep in mind the liberation of the spiritual powers of the learner. In each individual, spirit and matter, as it were, vie for the ascendency over the individual. If the spirit is to be the master, and Maritain considers this to be the proper order of nature, then there must be discipline and control of the material or animal nature of man. The discipline of the material will free the spiritual. The work of the teacher is to guide this liberation. It is for this reason that Maritain is in favor of discipline, which must always be used for the good of the pupils and never be harsh or cruel, but rather positive and helpful.

Inducement to good work must be positive and not restrictive or negative. This stands in accord with the findings of educational psychologists of the present time. Praise and reward for good actions are the best methods of motivation. Along with these qualities in the good teacher, Maritain stresses the need to develop the power of original thought in the pupil. In this he agrees with the authorities in modern educational problems. He advises the teacher to make sure that the pupil thinks through the problems confronting him, and holds that, unless the pupil does this, the knowledge he gains will be of little use.

Finally, the teacher is advised to foster and respect that intellectual intuition, that direct approach to truth, which is found at certain times in the reasoning of all young people and which is the outward sign of the inner power of the intellect. Maritain considers the liberal arts as the best means of promoting intellectual development, and a liberal education as the proper one for the development of good intellectual habits.

Various Stages in Education

When Maritain has examined the dynamics of education, the operation of the learning process and the necessary dispositions of the teacher, he proceeds to a consideration of the ability of the pupil to receive instruction. He sees three distinct stages in the development of the student—childhood, adolescence, and maturity. Each stage has its personality characteristics and each demands a

different emphasis on the part of the instructor. The child lives in the realm of imagination and needs instruction which is based on imagery and wonder. Other authorities agree in this, seeing the child as different from the adult, and advocating instruction which takes this difference into consideration.

Maritain maintains that, even at the lowest level, the educative process is to be directed to the acquisition of truth, though the means must be those which will be effective at the child's intellectual level. All the approved means of modern education are to be used, visual education, interest-arousing presentation and controlled direction under the supervision of skilled teachers.

Maritain criticizes modern educational thinking as over-stressing the physical elements in the child-education processes while ignoring or underestimating the spiritual development of the learner. Though he stresses the importance of the imagination, Maritain also sees a possible danger in over-stressing it without adequate controls, since the child lives so deeply in the imaginative realm that the dividing line between reality and imagination is not always clear to him, and the teacher must take precautions that such a distinction be made.

In the adolescent stage, the imagination ceases to be the primary element in the learning process and the adolescent becomes aware of and enamoured of truth. It is the business of the educator to see that this awakening delight in truth be encouraged, lest the searching intellect of the youth lose its enthusiasm and become weary of seeking truth among the uninteresting mass of dully taught material. Some modern educators see education as a preparation for the daily work in which the youth will later engage. They would have the school prepare him for the work of life by teaching him the technicalities of industry rather than the fundamental activities of the intellect. Maritain stresses the delight and desire the adolescent feels in the acquisition of truth, rather than the perfection of the technicalities of the subject-matter which he studies. Maritain claims the emphasis should be on the wide field of the truth rather than on the detailed mastery of the science being learned.

While placing the emphasis on liberal rather than technical education, Maritain sees a very necessary place for the latter in the education of youth, though he does claim a priority for the intellectual development over the mechanical training of the pupil. To carry out his theories as to the emphasis in education, he would have the liberal arts stressed thoughout, beginning in the lower years of the school and advancing to the higher levels of education. He would have philosophy and theology taught by all universities,

though not as compulsory subjects and not limited to any fixed system or school of thought.

Relationship Between Present Conditions and Education

Maritain sees the present condition of society as a direct result of the philosophy stemming from the doctrine of Descartes. Refusal to seek truth, denial of absolute standards and forgetfulness of the spirituality of man have produced the conditions which are regretted by the thinking men of the present age. These conditions he sees as possible of correction through education. A realization of the worth of the individual, the democratic ideal, can come only through education for truth. It is only through correctness of thinking on the part of the individual that correctness of thinking in society is possible. It is only by accepting the true principles of moral thought that society can be regenerated and led to the freedom and values of democratic living.

The goods of democratic living are for all men, and it is the role of education to place them within the reach of all citizens. To Maritain, this means a liberal education since it is the best development of the intellectual powers of man. Thus it is the duty of the state authority to see that the rights and freedom of education are granted and preserved within the state.

Danger to educational freedom may arise if the state attempts to use its educational system to inculcate political ideas and shape its citizens in a political mold rather than to develop them intellectually. Maritain warns of this danger and points to the unhappy history of those European states which so debased education in the past. The best and surest means of advancing true democratic thinking and living is to allow the schools to carry on their work of intellectual development in the way in which they are best fitted to do so, with state aid if necessary but never with state interference in their proper work.

The training of young citizens is the work of many agencies, of which the school is one. All these agencies must be inspired with a desire to shape the young in the good ideals of life, showing by example the end to which they would guide the learner. Education is the formal presentation of the way of life which is most suitable for the realization of the personal worth and value of the individual. It is by right education that the errors of the past will be corrected and the promises of the future realized. It is for this end that Maritain outlines his theories of education. To this he has dedicated his life and his work. He writes that men of today may be spared the long and painful search which he found necessary.

BIBLIOGRAPHY

Aquinatis, S. Tomae. *Summa Theologica* (7 Vols.). Taurini, Libraria Marietti, MCMXXXVII.

Bibliotheque de la Revue Thomiste. *Jacques Maritain. Son Oeuvre Philosophique.* Paris, Decsalée de Brouwer, editeurs, 1949.

Maritain, Jacques. *Antimoderne.* Edutions de la Revue des Jeunes. Paris, Desclée et Cie., 1922.

.....*Education at the Crossroads.* New Haven, Yale University Press, 1943.

.....*Freedom in the Modern World* (translated by Richard O'Sullivan). London, Sheed and Ward, 1935.

.....*St. Thomas Aquinas* (translated by J. F. Scanlan). London, Sheed and Ward, 1931.

.....*Three Reformers.* London, Sheed and Ward, 1950.

.....*The Rights of Man and Natural Law* (translated by Doris C. Anson). New York, Charles Scribner's Sons, 1943.

.....*Ransoming the Time* (translated by Lorin Binsse). New York, Charles Scribner's Sons, 1941.

Maritain, Raissa. *Adventures in Grace* (translated by Julie Kernan). New York, Longmans, Green and Co., 1944.

.....*We Have Been Friends Together* (translated by Julie Kernan). New York, Longmans, Green and Co., 1940.

Pegis, Anton C. *Basic Writings of Saint Thomas Aquinas* (2 Vols.). New York, Random House, 1945.

Phelan, Gerald B. *Jacques Maritain.* New York, Sheed and Ward, 1937.

TEXTS IN MEASUREMENT AND EVALUATION

S. C. T. Clarke and G. M. Dunlop
Faculty of Education, University of Alberta

Recent texts in this area appear to fall into three categories: handbooks for teachers, routine treatments of measurement and evaluation, and psychological testing. Every author must decide between the 'how to do it' approach of the handbook, the extensive applications of measurement and evaluation in such areas as reporting, promotions and grouping, and the specialized fields of psychological testing of intelligence, achievement and adjustment. A review of one recent book of each type will indicate the manner in which various authors have handled this problem.

Magnuson, H. W., Larson, C.A., and Shellhammer, T. A. *Evaluating Pupil Progress.* California State Department of Education, Sacramento, 1952. 163 pp.

This is a handbook of evaluation. Its greatest merit is found in the numerous examples collected from the best practices in California schools. The approach is practical rather than theoretical, using an extensive coverage rather than intensive treatment of any one aspect of evaluation. For example, the thirteen chapters average twelve pages each. The chapter on "Evaluating Attitudes" contains a distinction between attitude and opinion, examples of attitude scales developed by Thurstone, Remmers, and Likert, a brief consideration of public and private attitudes, teacher-made attitude scales, unfinished stories, and observation of behavior as methods of appraising attitudes. Obviously, in seventeen pages, a full one of which is utilized for line drawing illustrations, an exhaustive treatment of these topics is impossible. The merit of this book is that the treatment given is sound, understandable, and practical.

Teachers and principals will find *Evaluating Pupil Progress* a most valuable handbook to have on their desks. The coverage includes teacher-made tests of achievement, intelligence testing, appraising personality and interests, such observational methods of appraising behavior as anecdotal records, rating scales, check lists, autobiographies, diaries and sociograms, and reporting pupil progress. As the senior author says in the preface, "The major emphasis in this publication is given to the instructional values to be derived from an all inclusive program of evaluation." The teacher and principal will recognize this practical emphasis.

Jordan, A. M. *Measurement in Education.* McGraw Hill Co., New York, 1953. 521 pp.

Here we have a standard text of over five hundred pages, which is unique in the treatment given to the school subject-matter areas. The teacher of English is naturally most interested in measurement in his area. Many books in measurement and evaluation disappoint such a teacher by general statements not related to this special field. Jordan's book will not disappoint in this respect, for it has three hundred and fifty-seven pages devoted to measurement of the school subjects, from reading and handwriting to business and physical education. Jordan sticks to the title given, and gives emphasis to the description and illustration of the standardized measuring devices in each area. However, from these the alert teacher can secure many sound and proven techniques for classroom use.

Measurement in Education rounds out the treatment of evaluation by scholarly parts devoted to measurement of intelligence and personality. One chapter is devoted to statistical methods, and constitutes a splendid review for those who already know statistics.

The author notes in this preface that he has intended to stress the fundamental principles involved in measurement. These principles are illustrated by numerous samples and items from tests. Principals and teachers will find this text an authoritative library reference, but would not likely keep it on their desks as a handbook for aid in the day-to-day job of measurement and evaluation in the classroom.

Thorndike, R. L. and Hagen, E. *Measurement and Evaluation in Psychology and Education.* John Wiley and Sons, New York, 1955. 576 pp.

The ambitious title of this work should not deter the reader. In general content, this text lies between the two previously described. Like *Evaluating Pupil Progress,* it deals with practical classroom problems such as the teacher's own tests, behavioral measures of personality, planning a school testing program, and marking and reporting. Like *Measurement in Education* it has a strong emphasis on measurement by standardized tests. In the preface, the authors claim that the text emphasizes the need to define the objectives of measurement, and that poor test items and the same items improved are used as examples of measurement techniques. The busy classroom teacher might be disappointed to find only two chapters which seem to be directly devoted to these worthy aims, though replete with illustrations from a single unit in social studies, the content of which is alien to the Canadian scene. Further study of this text would indicate that the emphasis on defined objectives does indeed run throughout, and is one of the important and valuable contributions made by this book. The administrator will be pleased

with the chapter on planning a school testing program, since it analyzes the possible functions of program measurement. The succeeding chapter on marking and reporting raises the fundamental principles involved, leaving the particular solutions to the administrator or teacher.

This text casts the net wide. What is done is soundly done, but briefly. In a sense, the book covers a wide area in summary fashion. It is a scholar's book.

BOOK REVIEW

YOUTH AND TOMORROW—A Guide to Personal Development in the Early and Middle Teens by S. C. T. Clarke and J. G. Woodsworth (Toronto, McClelland and Stewart Limited, 1956).

Written for Grade IX students and adopted for use in the schools of Alberta, this textbook is perhaps the first of its kind by Canadian authors. Its general content is stated in the preface: "Most of this book is about personal, rather than physical, development in boys and girls. That is, it deals with how people develop mentally, socially, and emotionally, rather than with the growth and functioning of their bodies."

One of the difficulties in a text of this kind is that the presentation may stress adjustment in the sense of conformity. In an excellent introductory statement, J. D. Griffin, M.D., General Director, Canadian Mental Health Association, considers this difficulty as follows: "A mature person is one who has learned to examine, understand, change and improve his patterns of feelings as an individual in relation to society. The mentally healthy person is not necessarily always a perfectly conforming 'reasonable' and unprotesting person. Yet he is definitely one who has learned self-discipline." Whether the authors have been able to present their material in such a way as to produce the mature individual will await the test of use. The pattern of each chapter (there are sixteen in the book) stresses a factual approach. A situation is described, the facts which bear on this situation are presented, the facts are then carefully interpreted, and finally are applied in a graded series of exercises. The classroom teacher will welcome this latter section, which ranges from vocabulary and knowledge of the facts to class projects which permit the capable teacher to use skill and imagination in the development of the mature individual.

The format of the book is most attractive. It is the handy $5\frac{1}{2} \times 8$ size. The insides of both covers are illustrated with composite photographs of school life. Each of the six parts (Taking Stock, How To Get The Most Out of School, Understanding Myself, Understanding Others, Planning For The Future, Thinking It Over) is preceded by a photograph or a composite illustrating the theme of the part. Over fifty line drawings in half tone are sprinkled throughout the book, to illustrate ideas and heighten the reader's interest. There are few pages in this text which are unbroken print.

Will it be interesting to Grade IX students? Will it help young people to develop mature personalities, citizenship, and character?

Naturally the answer to such questions is dependent not only on the book but on the teacher. The style and level of writing should appeal to the fifteen-year-old, and the numerous examples from school and everyday life help to add interest. Technical terms have been kept to a minimum. Abstract concepts have been described in terms of daily living, wherever possible. However, this reviewer anticipates that the chapter on Living Democratically will challenge the bright student and perhaps leave the mediocre untouched.

Youth and Tomorrow omits two areas of personal development: sex education, and the home. It covers a personal inventory, how to study, character development, social relationships, vocational choice, and plans for next year. Curriculum makers each have different ideas of what should be covered in such a book, but the breadth of these mentioned (omitting the controversial areas of sex education and home life) should encourage the wide use of this attractive text.

It bears repeating that *Youth and Tomorrow* is no advocate of "soft psychology", nor does it over-stress the conforming aspect of adjustment. Rather its stress is upon the effective development of unique self-disciplined individuals within a society.

R. S. MacArthur.

The Alberta Journal of Educational Research

Vol. II *1956*

THE COMMITTEE ON EDUCATIONAL RESEARCH
Faculty of Education
University of Alberta

Editorial

THEY ARE GIVING US THE TOOLS

Dean H. T. Coutts

May 18 and 22 were important days for the Faculty of Education. On May 18 the W. K. Kellogg foundation announced a grant of $127,540 to assist the University of Alberta in expanding its graduate program in educational administration and supervision. Four days later the Carnegie Corporation announced a grant of $50,000 in support of the University's program of educational research. Together these announcements give the added stimulus that should result in important contributions to Canadian education.

The Kellogg grant, to be paid over a five-year period, will bring to the University each year some ten to fifteen students of educational administration and supervision. They will be enrolled in the School of Graduate Studies, most of them as candidates for the Ph.D. degree. These students will come from various provinces of Canada. Since most of them will be mature men and women already employed as school administrators and already carrying heavy personal responsibilities, the grant provides for generous financial assistance. Further assistance will be given by their employers and by scholarships to be solicited by the Canadian Education Association from interested individuals and institutions.

The program in administration and supervision will actually be an extension of that already offered in the Faculty of Education at the master's level. Students will be able to pursue it in four stages leading to a Diploma in Educational Administration and Supervision, a Master of Education degree, a Specialist Diploma, and a Doctor of Philosophy degree. The term 'administration' is to be interpreted very broadly—including studies in political science, law, business administration and supervision as such. It will include also field studies and research. One of the outcomes of the program will be the extension of research studies related to educational administration and supervision. A body of consolidated research in this area is very much needed and long overdue.

The Carnegie grant, also to be paid over a five-year period, is restricted to the research needs of the Faculty of Education. Besides providing assistance to two or three fellows, the grant will permit the extension of library facilities and publications concerned directly with research. Educational studies made possible by this grant will include research related to elementary and secondary schools and to universities. Any significant problem in public or private

education is of interest to the Faculty Committee on Educational Research. The Carnegie grant makes possible the extension of research into educational areas not previously investigated.

The new grants offer a challenge for the University of Alberta to become a leader in the preparation of school administrators and research workers in education. More important still, they should help us find more accurate solutions to some of the persistent and vexing problems in education.

With these grants the Faculty of Education will expand its graduate studies and research programs over the next five years. To maintain them at the expanded level means that there will be need for more rather than less support from the University and from those other institutions and individuals who have at heart the welfare of boys and girls.

A CHALLENGE TO THE FACULTY OF EDUCATION

G. M. Dunlop
Faculty of Education
University of Alberta

Introduction

1956 will be memorable in the history of Alberta education as the year in which two awards were made to the University of Alberta by American foundations. The Kellog grant provides funds for the development of a graduate program in educational administration and supervision, and is the outgrowth of the highly successful CEA-Kellogg Short Courses, in which the Faculty of Education played so large a part. The Carnegie grant in aid of educational research, too, constitutes a recognition of the existing research organization and its healthy record of achievement.

1. The University of Alberta—Kellogg Foundation Graduate Program in Administration and Supervision

The Submission and Grant

The graduate program in educational administration and supervision in the University of Alberta is an outgrowth of the CEA-Kellog Five Year Project in Educational Leadership, which brought to our campus superintendents and inspectors of schools from every province in Canada. The staff of the Faculty became increasingly involved in the operation of the short courses, and had an unequalled opportunity to develop an insight into Canadian educational problems and to acquire a wide acquaintance with educationalists from all parts of the dominion. Under these circumstances the University was stimulated to think in terms of extension of its graduate program in administration and supervision in the hope that it might become a Canadian center for advanced studies in this area. Under the leadership of President Andrew Stewart a submission was developed for presentation to the W. K. Kellog Foundation. Helpful advice was received from Dr. Althouse and Dr. Swift, presidents of the CEA, from Freeman Stewart, secretary of the CEA, and Dr. Flower, Director of the first Five Year project. On May 18th, the Kellog Foundation announced the award of $127,540 to the University for the expansion of the graduate program in administration and supervision.

Organization and Program

Planning of the graduate program has been based on three important principles. First, the program must be national rather

than provincial in its program, staffing and students. Second, it must involve all educational organizations: Departments of Education, school boards, school systems and the community. Finally, it must be practical, experimental, based on field experience as well as on theoretical and academic studies.

A new division of educational administration and supervision must be created. Its director must be a man with excellent academic qualifications and wide administrative experience. He must become acquainted with Canadian education and educationalists throughout the ten provinces in order to achieve organization, planning and liaison at the national level. It is expected that he will be assisted by a new appointment from the Old Country, the best available British authority on administration and supervision. American experts will be brought in each semester to present the American viewpoint. It is to be remembered that these new appointments are additions to the present competent staff. Finally, leaders in Canadian education will be drawn upon each year for short courses of lectures, workshops and seminars.

The program is a combination of the old and the new. One year of academic study after the bachelor's degree will qualify a candidate for a Diploma in Educational Administration and Supervision. Completion of six courses and a thesis will win the master's degree. The Specialist's diploma will be earned by an additional year of study. Finally, the Ph.D. degree will be awarded under the conditions described in the new university calendar.

Since candidates are expected to possess excellent qualifications and a record of successful professional experience they will tend to be more mature than ordinary graduate students. For this reason generous financial assistance must be provided. In addition, the program must involve workshop seminars, field experience, internship and research with a lessened emphasis on course requirements and lectures, especially in the post-master's program.

The achievement of a national approach to the problems of administration and supervision is essential to the success of the project. This will be insured in a variety of ways. First, the congregation on one campus of candidates from the ten provinces will encourage wide exchange of ideas concerning current administration practices, a process of cross-fertilization of ideas which cannot fail to be valuable. Next, there is the broadening of staff background through new appointments and wide use of prominent educationalists from across Canada. Inevitably the research arising from individual and group projects and dissertations will be Canada-wide in scope. Finally, perhaps the greatest guarantee of a national orientation

comes from the continued close association with the CEA executive and its officers.

How the Grant Will be Used

The funds available for the development of a graduate school in administration and supervision are not limited to the Kellogg grant. The University of Alberta is prepared to increase its budget to reinforce the project. It is hoped that the employers of candidates will assist in various ways in making postgraduate study possible. From these sources funds will become available over a five-year period to provide for the following:

1. The equivalent of three new staff members.
2. Lectures and short courses given by leaders in Canadian education.
3. Office assistance and equipment.
4. A strengthened library in administration and supervision.
5. Staff training, liaison and travel.
6. Adequate financial assistance in the form of scholarships and honoraria for teaching and research assistants to permit ten to fifteen scholars to finance advanced studies in Alberta.

Albertans will wonder about their eligibility for scholarships and honoraria. Under present plans they are as eligible for grants as candidates from other provinces. The awards will be made in terms of record of scholarships and professional attainment. There is one limiting factor. To avoid the danger of academic "inbreeding" the Council of the School of Graduate Studies has ruled that to become eligible for candidacy for the Ph.D. degree a student must have taken one degree in another university of approved standing.

What is the expected pattern of development during the next five years? It is anticipated that with a record of achievement resulting in increasing prestige in administration and supervision, there will be a steady growth in the number of candidates seeking advanced studies. Many will not be able to secure the financial assistance made possible by the Kellog grant. New scholarships must be developed. At the end of five years it is hoped that the graduate school will continue to expand without foundation assistance.

2. The University of Alberta—Carnegie Corporation Five Year Project in Educational Research

The Carnegie grant will be paid to the University of Alberta in five annual instalments to be used in the development of educational research. Under the terms of the award, $50,000 will be paid to the University over the five-year period to be used in accordance with

a budget which is part of the agreement with the Carnegie Corporation.

The Alberta Advisory Committee on Educational Research is the body entrusted with the financing of the research program. It approves the annual budget and advises on research needs. This committee will include the annual Carnegie grant in its current revenue and will authorize disbursements in terms of the budget agreement and the requirements of the ongoing program.

The formal submission to the Carnegie Corporation describes the disposition of funds from foundations and local sources for the five years of the program. The additional funds permit a well balanced research program, although still limited in extent. Each year sufficient funds will be devoted to research to permit an appreciable enlargement of the program. Provision is made for a secretary and later for a manager of the research organization. Funds are provided for an increased program of publications. A library is to be organized and research equipment purchased. Research fellowships are available for candidates for the M.Ed. and Ph.D. degrees.

The Increased Research Program

The research program must meet the needs of education in Alberta. There must be a continuing alertness to problems. Teachers, A.T.A. locals, school board members, members of the Home and School Associations, superintendents, high school inspectors, officials of the Department and Faculty members must strive to identify problems and transmit them to the research organization. A wise selection of problems for immediate study must be made. Research workers must be trained. Above all, the organization must be created for the wider involvement of educationalists interested in embarking on study of specific problems. In effect this is done through contact with the Faculty Committee on Educational Research. To facilitate such contacts the Department, the A.T.A., the superintendents and high school inspectors now have representation on the committee, and may assist in the initiation of new projects. Eventually it is hoped that small research committees will come into existence in other cities and towns for the purpose of identifying problems, securing endorsation and support of the Faculty Committee, and, with such guidance as may be necessary, conducting the needed research. The research movement should be province-wide, not centered in the University. The research organization exists as much for the encouragement as for the conducting of research.

Another encouraging feature of the situation is the fact that with Kellogg and Carnegie aid as many as seventeen M.Ed. and

Ph.D. candidates from all the provinces of Canada will be drawn to our campus for intramural advanced studies. The research necessary for dissertations in qualification for advanced degrees will provide trained research workers with wide opportunities to work on urgent provincial or national problems.

How much research can be attempted at one time? Even with Carnegie aid the amount must be limited. However, each new project is usually supported by supplementary grants. In one case an urban school board may make a special contribution. Sometimes divisional boards may make substantial donations. In other cases grants come from teachers' locals, community organizations, service clubs, or industry. Sometimes the Department of Education will provide the necessary testing instruments, which is the equivalent of a large contribution. Every group sponsoring a project should explore the possibilities of special donations to specific projects. Aid of this kind could greatly extend the research program.

Staffing the Project

All university-centered research organizations receive guidance and direction from members of the Faculty, who are already on the university payroll, and are expected to engage in research as part of their regular duties. If an overload of work occurs, the university administration may be expected to make provision for it. This reduces the problem of staffing a research organization to a matter of providing for a full time secretary-librarian and, later, a manager. It is understood that much clerical and statistical assistance is required for each project. This staff is hired by the hour from the pool of senior and graduate students on the campus, and paid for from the project's grant. Additional secretarial assistance is secured in the same way. The plan has some virtue. It insures the maximum research with as little cost as is possible. At present the problem of a manager remains unsolved. Probably it is best to leave it this way, as in time the operations of the research committee will define its needs more clearly.

Publications

We are well pleased with the new format of the *Alberta Journal of Educational Research*. It will continue and grow. There is a need for two additional publications. First is the *Research Newsletter*. It will be a four-page report on plans and progress of on-going projects, and will spell out the findings of research in the language of the man on the street. It will go to all boards of trustees, all Home and School Associations and teachers' locals. It will constitute an effort in the direction of improved communication and better public relations. Since it will be relatively inexpensive

it will be distributed free of charge. Second, we hope to publish the occasional *Educational Research Monograph*. Each monograph will summarize Alberta research in a certain area, selecting its materials from a number of individual projects. A valuable feature of each monograph will be the summarization of research findings elsewhere on the subject under study. The monographs are intended to be scholarly contributions to the literature, suitable for library shelves; they must, of necessity, have a better binding than the research journal. The monographs will consolidate the more important research in reasonably permanent form, and will be the prestige publication of the organization.

Research Library and Equipment

All research is based on and aided by access to the books, journals and monographs which contain the reports of current and past research. Nothing is more time-consuming than interrupting one's work to go to a library, perhaps in another building; and there is always the frustration of finding that a particular journal is not immediately available. It has been decided, therefore, to establish a library devoted to educational research which will be maintained by the research committee for the use of a limited number of persons actively engaged in research. In terms of the total budget the money required will not be great, yet no single factor will contribute so much to the advancement of the quality of research.

At first the library will be controlled by the secretary-librarian. Later it may require the services of a trained librarian. The greatest care will be exercised in regulating its use, as, obviously, its chief attraction is the fact that its materials must always be there, ready for use by the research workers.

The University has provided the research branch of the Faculty with first class computing equipment. Whether we will require IBM machines for card punching and sorting, item analysis and test correction must be left to the future. At present we have access to such equipment as the university owns, and, by arrangement, may use the equipment of the departments of Education and Municipal Affairs.

Research Fellowships

Under the Carnegie agreement the sum of $5,500 will be used for fellowships in 1956-57, rising to $8,000 in 1960-61. This will permit two major awards of $2,500 each, and a minor award of $500 to three candidates for the M.Ed. or Ph.D. degrees. The awards are being brought to the attention of candidates across the Dominion, and will be given to the most deserving in terms of academic and professional attainment. Parenthetically, Albertans may be accepted as candi-

dates for the Ph.D. degree if they hold one degree from another university. Applications for these awards may be made to the Dean of Education now. The fellowships are intended to finance intramural study leading to an advanced degree.

The fact that fellowships of this nature are available this year under the Carnegie grant, and that more will be available in 1957 and thereafter under the Kellogg and Carnegie agreements, is bound to result in an unprecedented influx of able and experienced scholars from all parts of Canada. This means that the emphasis on graduate studies will be greatly increased. It also suggests that the variety of candidates will make for an atmosphere of mutual stimulation in educational matters which may raise the Alberta campus to national status.

3. The Future

The Carnegie and Kellogg awards are, at once, a challenge and a recognition. They would not have been made had the faculty not shown potential for growth. The role played by the staff in supporting the CEA-Kellogg Short Courses paved the way for the new Kellogg award for a graduate program in administration and supervision. The creation of a cooperative research organization in Alberta, unique in the Canadian provinces, made possible the Carnegie grant in aid of educational research.

The challenge of these grants is to further growth. Of the research organization and the research program of the faculty generally the challenge can be expressed in a simple question. Can the faculty utilize the Carnegie grant in such a way as to emerge at the end of the five year period with a functioning and effective research organization, a record of significant and definitive research, and a smoothly functioning research program in its graduate school which qualifies it for national recognition.

For the graduate school the challenge is to use the Kellogg grant in such a manner that the University of Alberta, in the next five years, will attain national status as a center for advanced studies in educational administration and supervision.

So much for the immediate challenge; another, will come at the end of the five year period when foundation assistance is withdrawn. If the graduate program is to continue it will have to secure increasing financial support from the University. This will certainly follow if, during the five year period, the graduate program gains wide recognition, and a steady flow of candidates from other provinces. The research organization will also require more assistance than is presently available. It may secure more support from the University. It should plan, however, for more donations, con-

tributions from school boards, teachers' organizations and from industry.

Another challenge following the five year program is the replacement of the scholarships which have been created by Kellogg and Carnegie funds. In all probability these could be secured from industry, as industry increasingly accepts its obligation to the universities.

The prospect of growth is always stimulating. The Faculty of Education must meet the immediate challenge of development of an effective graduate school, and the operation of an efficient research program. It must, at the same time, plan for the continuance and extension of both programs after external aid disappears. This is, at once, our problem and opportunity.

INSURANCE PRACTICES AND EXPERIENCE OF DIVISION AND COUNTY SCHOOL SYSTEMS IN THE PROVINCE OF ALBERTA

HAROLD J. HALL
Superintendent of Schools
Rocky Mountain School Division No. 15

The Problem

It is common knowledge that through the careful compilation of significant data, the application of statistical methods by competent actuaries, and the use of special training programs for personnel, modern insurance companies have prepared themselves for the scientific underwriting of an exceedingly wide range of insurable risks. It is also common knowledge that Alberta School Boards, as public trustees, assume a variety of risks which may or may not be insured. What school risks are insured, what types of insurance are carried, from whom insurance is purchased, and whether expert guidance is sought is planning insurance programs, or whether any definite insurance plans exist at all, are things which are not so generally known. It is with these things in mind that answers to two broad questions are sought: how do school boards spend their insurance dollars, and are these dollars wisely spent?

The School Act states that the board of a school division shall "insure and keep insured all school buildings and equipment."[1] The Act makes the insuring of school moneys handled by the treasurer mandatory;[2] and it gives school boards the right to exercise discretionary powers in determining whether to "effect and keep in force a policy or policies indemnifying the board and its employees, when acting on behalf of the board, against liability in respect of any claim for damages or personal injury."[3] The Public Service Vehicles Act states that no certificate of operation of a school bus shall be granted unless the vehicle is covered by a passenger hazard liability insurance policy, the minimum limits of which are set forth in the Act and vary according to the capacity of the bus.[4] Thus school boards are legally bound to carry a treasurer's bond (the amount of which is determined by the Minister of Education) and to carry fire insurance; they must carry passenger hazard liability insurance on school-owned buses, and they have the right to carry other forms of liability insurance.

1Alberta Department of Education, **An Act Respecting Schools**, Sec. 222(f), p. 68.
2**Ibid.**, Sec. 194, p. 62.
3**Ibid.**, Sec 175(c), p. 52.
4Alberta Department of Highways, **The Public Service Vehicles Act and Regulations**, Sec. 6.3.1, p. 85.

Related Studies

Fire insurance

In 1935 Holy reported on a study of state insurance plans for school buildings in Wisconsin and North Dakota and on a self-insurance plan in Cincinnati.[5] Under the Wisconsin plan, started in 1903, the fire-insurance rates charged for school buildings were 49 per cent of those charged by regular stock companies in the state. The rates charged under the North Dakota plan, which started in 1919, were approximately 75 per cent of those charged by fire-insurance companies operating in North Dakota.

The self-insurance plan put into effect in Cincinnati in 1912 was estimated to have saved Cincinnati $204,000 in the first twenty-two years of operation. Holy based this finding on insurance premiums paid in five other large cities in Ohio. He found that no appropriation to the Cincinnati self-insurance fund had been made by the school board during the eleven-year period preceding his study in 1935.

In 1947, twelve years after Holy's study, Shuman re-investigated the Cincinnati self-insurance plan.[6] He found that after thirty-five years of operation the Board of Education had paid $317,480 into the insurance fund, had taken $42,117 out to pay losses and safe-deposit rental, and still had $637,092 left in the fund due to its earnings.

Shuman reported that in 1928 the general assembly of Pennsylvania authorized a study of school-plant insurance covering the five-year period prior to 1928 and including about one-quarter of the school districts in that state exclusive of Philadelphia and Pittsburg.[7] Losses were found to be slightly more than 20 per cent of the premiums. Shuman reported that similar studies in Arkansas, Maryland, Missouri, Texas, and Virginia showed the respective losses of these states to be 41.1, 17.2, 39, 49.2 and 77 per cent of the premiums paid; and that a school fire-insurance study made by The Education Council of the Ohio Education revealed that in the years 1930-46, Ohio boards of education spent eight million dollars for insurance and received in adjustment for losses 23 per cent of the premiums they had paid.

The National Association of Public School Business Officials carried out an extensive study of school insurance which they reported in 1932.[8] They found that school districts of 345 cities of 33 states and of 35 Canadian cities, for the ten-year period 1921-30, jointly reported that approximately 29 per cent of the premiums paid for fire protection had been returned in settlement of fire

[5]T. C. Holy, and John H. Herrick, "School-plant Insurance," **Encyclopedia of Educational Research** (1950), p. 1,117.

[6]**Ibid.**

[7]**Ibid.**

[8]**Ibid.**

losses. Forty-nine city school districts and five states reported that they were successfully operating their own insurance plans at low costs. The high prevailing rates of stock insurance companies were declared to be responsible for causing school and other public officials to seek protection through self-insurance and mutual companies. The Association stressed the importance of complete records of insurance experience, knowledge of property values, and dependable property appraisals for insurance purposes.

School bus insurance

In 1940 Noble published an extensive study of pupil transportation in the United States.[9] He included in his report the findings of a number of important transportation studies which had been made previous to his own. Noble affirms that the whole field of transportation insurance needs to be studied in order that more desirable practices may be identified and generally adopted; that most state education departments do not assemble necessary data concerning coverage, premiums, claims, and accidents; that most states are not in a position to furnish reliable advice on transportation insurance due to lack of adequate data; and that there is no uniform policy regarding transportation insurance.[10]

Insurance companies, Hutchins estimated, returned in settlement of claims less than five per cent of the premiums which school boards paid for transportation insurance.[11] As one step which might be taken to reduce the cost of insurance, Hutchins recommended that school boards avoid excessive liability coverage. Van Ausdal reported a tendency among school boards to avoid liability insurance policies which provide coverage of more than five thousand to ten thousand dollars per person.[12]

Following a study of 3,880 buses in Ohio, Van Ausdal reported that the school boards had paid $160,546 for transportation insurance in 1938 and that insurance companies had returned $5,489 in settlement of claims—3.4 per cent of the premiums paid.[13] Van Ausdal recommended that Ohio school boards provide accident insurance protection in the amount of five hundred dollars for a pupil death with scaled amounts for injuries and compensation for medical fees; and that they provide liability insurance in the amount of five thousand dollars for property damage and not exceeding twenty-five thousand dollars for bodily injury.

Joyner studied school transportation insurance costs for eighteen districts in twelve different states for the period starting with the

9M. C. S. Noble, **Pupil Transportation in the United States.**
10**Ibid.**, pp. 478-82.
11**Ibid.**, p. 482.
12**Ibid.**, p. 484.
13**Ibid.** pp. 485-6.

school year 1927-28 and ending with the school year 1937-38.[14] He found that on school-owned buses the amount of paid claims was 13.1 per cent of the total premiums, and that on contract school buses the paid claims amounted to 40.3 per cent of the total premiums.

Noble reported that in a study of 2,923 buses in 163 rural districts made by Teachers College, Columbia University, it was found that claims paid amounted to 12.22 per cent of the cost of insurance.[15] His own extensive studies in the field of school transportation insurance led him to conclude that "since all studies reported reveal such wide differences between premiums paid and claims, either reductions in the rates charged by insurance companies or state programs of insurance are warranted."

The Encyclopedia of Educational Research in reviewing studies in the field of school transportation insurance states that "the most impressive fact revealed by the comprehensive survey made by the National Education Association, Research Division, and the Office of Education is the confused and nebulous situation which exists in the field of school transportation insurance."

Liability and pupil accident insurance

Reeder[16] states that the power of school boards to purchase liability and pupil accident insurance is not nearly so clear as their power to purchase fire insurance. He points out that courts have held that a school district is not, in the absence of a statute imposing it, subject to liability for injuries to pupils of public schools suffered in connection with their attendance thereat. However, Reeder notes a recent tendency on the part of the courts in some states to hold school boards liable for the negligent performances of duties. Justice and logic, he concludes, point to the fact that school boards can do wrong, and should be held responsible for their torts. A review of school insurance studies given in the Encyclopedia of Educational Research[17] indicates that courts are divided as to whether school boards can be held liable for damages. The writer of the articles, however, contends that "government non-liability in tort is indefensible and should be superseded by statutory enactment."

Method of Securing Data

For the present study a questionnaire was developed and mailed to the secretaries of the fifty-two Divisions and seven Counties in

14Ibid., p. 492.

15Ibid., p. 489.

16W. G. Reeder, **The Fundamentals of Public School Administration,** pp. 452-3.

17Newton Edwards, "Court Decisions," **Encycopedia of Educational Research (1950),** pp. 1,095-6.

Alberta. Detailed information was requested for the calendar year 1954 and estimates for insurance expenditures and indemnities only were requested for the ten-year period 1945-54. Fifty-one secretaries (86.3 per cent) returned questionnaires. Wherever sections dealing with specific types of insurance were left blank, or stroked out, they were judged not to apply to the particular school system.

Respondents were asked to supply information relative to the following types of insurance:

Fire Insurance
Tornado, Cyclone, Windstorm, and Hail Insurance
Boiler Insurance
School Bus Insurance
Playground and Premises Liability Insurance
Employer's Liability Coverage
Accident Insurance
Insurance against Theft, Robbery, or Pilferage
Secretary-Treasurer's Bond
Glass Insurance
Other Insurance Carried but not listed above.

Alberta Insurance Practices and Experience

Fire insurance

In an attempt to discover whether school insurance business had been placed in accordance with definite policies formulated by school boards or placed as much by chance as by rule, respondents were asked to state the basis upon which fire issurance business had been allocated. School boards subscribe to a variety of policies, or no policy at all, as shown in Table I. Seventeen school systems (32 per cent) stated that they had no set policy for allocating insurance business. Only two school boards stated that their insurance business was allocated in approximately the same ratio as the school taxes paid by the various agencies within the school area. Twenty-five school boards (nearly 50 per cent) reported such allocation policies as dividing the area geographically and placing the business according to the location of the risk and the agent, selecting insurance brokers, and making insurance business open to bids. The policies reported in Table I suggest that a large number of school boards (more than 33 per cent) have not reached the point where they consider it necessary to formulate clear policies to guide them in placing their insurance business. The variety of practices subscribed to by those school boards which have formulated policies indicate lack of agreement as to what constitutes best practice.

TABLE I

ALLOCATION OF FIRE INSURANCE BUSINESS, FIFTY-ONE SCHOOL UNITS, ALBERTA, 1954

Policy	No. school units	Percentage of school units
1. No established policy	17	32
2. Business allocated in same ratio as taxes paid by agency	2	4
3. Business allocated according to geographical location of risk and agent	6	12
4. Policy limited to placing business with single agent	5	10
5. Business placed with insurance broker living outside school area	10	20
6. Business open to bids and awarded on bases of adequacy of coverage, quoted premiums, and services guaranteed	9	18
7. Policy not stated	2	4
Total	51	100

Nearly half (46 per cent) of the school systems which reported definite policies regarding the placing of fire insurance either placed their insurance with insurance brokers directly or made it open to bids which might be taken up by brokers. It is reasonable to suppose (and the marginal notations of several secretaries bear this out) that large, heavily insured, outlying school units will tend to place their business locally.

Arrangements for joint underwriting by a number of insurance companies were mentioned in marginal notations referring to some of the larger policies. Reference was also made to the practice by insurance brokers of returning a portion of the fees earned to the local insurance agents. One respondent stated that sixty per cent of the fee earned by the broker was returned to local agents, the remainder being retained as payment for his expert services. Another respondent reported that fifty per cent of the fee was returned to local agents.

In discussing placing of insurance, Reeder states that school officials have two problems.[18] The first is that of placing the insurance only with reliable companies; the second is that of

[18]W. G. Reeder, **The Fundamentals of Public School Administration**, p. 459.

apportioning the insurance to the different agencies on a just and equitable basis. Opening school insurance business to tender and consulting insurance brokers on school insurance problems clearly represent attempts to spend the insurance dollar wisely and to place it in reliable hands. Dividing school areas geographically for the purpose of awarding insurance business among local agencies in proportion to the taxes paid by each, and returning to local agents a share of the fees earned by the broker—these are attempts at just and equitable apportioning of school insurance business. In the present study only nine school units were reported as calling tenders for insurance and selecting agencies on the bases of service, reliability, adequacy of coverage, and quoted rates. This does not imply that other school units are spending the insurance dollar unwisely, but in a society based on free competitive enterprise the awarding of contracts through the medium of tenders is a recognized procedure.

In 1954 (Table II) school boards had in effect fire insurance policies amounting to more than forty-five million dollars. For this insurance they paid over one hundred forty thousand dollars. The insuring companies returned in settlement of claims arising out of loss due to fires occurring in 1954 nearly seventy-two thousand dollars. For every dollar which school boards spent for insurance in 1954 the insuring companies returned fifty-one cents in settlement of claims. In other words, the insurance companies returned in settlement of claims fifty-one per cent of the insurance premiums.

TABLE II

FIRE INSURANCE COVERAGE, PREMIUMS, AND CLAIMS PAID IN SETTLEMENT OF LOSS DUE TO FIRE, FIFTY-ONE SCHOOL UNITS, ALBERTA, 1954

Total amount of fire insurance reported in effect in 1954	$45,597,152.94
Total premiums reported chargeable to 1954 school accounts	140,349.02
Total claims reported paid in settlement of fire losses occurring in 1954	71,923.00
Ratio of claims paid to premiums paid	51/100

According to estimates made by secretaries (Table III), school boards paid over nine hundred thousand dollars for fire insurance for the ten-year period 1945-1954, and had returned to them nearly four hundred thousand dollars in settlement of claims due to fires occurring during the same period. That is, during the ten-year period 1945-1954, insurance companies returned 44 per cent of the premiums school boards paid for protection. The percentage of

premiums returned over the ten-year period 1945-1954 is seven per cent less than the return reported (Table II) for the year 1954—a fact which suggests that fire losses in 1954 were unusually high.

TABLE III

ESTIMATED PREMIUMS AND CLAIMS PAID DURING TEN-YEAR PERIOD, FIFTY-ONE SCHOOL UNITS, ALBERTA, 1945-1954

Estimated premiums paid for fire insurance, 1945-1954 inclusive	$908,795.79
Estimated claims paid in settlement of fire losses occurring during the years 1945-1954 inclusive	396,417.25
Ratio of estimated claims paid to estimated premiums paid, 1945-1954 inclusive	44/100

Bus insurance

Transportation insurance is written to cover a number of different risks, commonest of which are fire, theft, collision, property damage, and public liability. Fire insurance protects the owner against loss of the vehicle by fire, and theft insurance provides compensation should the vehicle be stolen. Collision insurance provides for reimbursement of the owner should his vehicle be damaged in collision with another vehicle or object. Property damage insurance, on the other hand, provides protection for the insured should his vehicle cause damage to the property of others. Public liability insurance protects the insured against loss arising out of court action. It is commonly written in two forms, road hazard and passenger hazard. Road hazard insurance covers liability which may arise out of the injury or death of persons not passengers on the vehicle. Passenger hazard insurance is the form of insurance which must be carried on school buses before a certificate of operation is granted.[19]

All school boards reported that they carried passenger hazard liability insurance on school owned buses. Nintey-two per cent of the school boards reported that they carried this form of insurance on hired school buses. Eight per cent of the school boards reported that they carried no insurance whatsoever on hired buses. School boards not carrying liability insurance on hired buses leave themselves unprotected against claims arising out of court action should they be sued jointly with the bus owner.

The lowest amount of passenger hazard liability insurance reported was five thousand dollars. This amount was within the

[19]Alberta Department of Highways, **The Public Service Vehicles Act and Regulations,** Sec. 6.3.1, p. 85.

requirements of The Public Service Vehicles Act.[20] However, on January 1st, 1956, Order-in-Council Number 1,003-55 set the minimum limits of passenger hazard liability coverage at ten thousand dollars and fifty thousand dollars for buses with passenger capacity not exceeding 12, ten thousand dollars and one hundred thousand dollars for buses with passenger capacity in excess of 12 but not exceeding 30, and ten thousand dollars and two hundred thousand dollars for buses with passenger capacity in excess of 30. It is interesting to note that 88 per cent of the school boards reported in 1954 that they carried passenger hazard insurance equal to, or in excess of ten thousand dollars as is now required by the Public Service Vehicle Act. It would appear from the reported coverage that school boards felt the need for increased protection before higher coverage was required by law.

Van Ausdal recommended that the amount of passenger hazard liability insurance carried by Ohio school boards should not exceed twenty-five thousand dollars for one claim.[21] Forty-one per cent of the liability coverage reported was in excess of twenty-five thousand dollars. In view of Van Ausdal's recommendation, many Alberta school boards appear to be carrying excessive passenger hazard liability insurance with respect to a single claim arising out of a bus accident.

School units reported (Table IV) that the cost of transportation insurance in 1954 was $82,903.88 and that the amount paid out on their behalf by insurance companies was $600.00. In other words, for every one hundred dollars spent by school units for transportation insurance, less than seventy-five cents was paid out by the insurance companies in settlement of claims arising out of the use of school buses.

TABLE IV

REPORTED COST OF SCHOOL BUS INSURANCE AND AMOUNT OF CLAIMS PAID, FIFTY-ONE SCHOOL UNITS, ALBERTA, 1954

Category	Premiums reported paid by school units	Claims paid by insurance companies as a result of accidents occurring in 1954
School-owned buses	$46,647.57	$600.00
Hired buses	36,256.31	.....
Total	$82,903.88	$600.00

20 Ibid.
21 Noble, op. cit., p. 486.

Van Ausdal reported that insurance companies paid out in settlement of claims 3.4 per cent of the premiums they received on school-owned buses.[22] Joyner reported 13.1 per cent for school-owned buses and 40.3 per cent for contract buses.[23] According to Van Ausdal, the ratio of settlements made to premiums paid was 4.5 times as high as that reported for Alberta, and the percentages reported by Joyner for school-owned and for contract buses were, respectively, 17.5 and 53.7 times as high as the percentage reported in Alberta.

School bus travel in Alberta should be relatively free from accident. The buses themselves are mechanically superior to the vehicles used at the time of the studies reported by Van Ausdal and Joyner; the roads on which the greater part of Alberta school bus travel takes place are not congested with traffic; and school bus equipment and its operation are subject to careful supervision and regulation by the Alberta Highway Traffic Board. Alberta School bus insurance rates should reflect the excellent conditions under which Alberta school buses operate. They do not. Paying eighty thousand dollars for six hundred dollars' protection is not spending the insurance dollar wisely. Alberta school boards should seek and get greatly reduced school bus insurance rates.

Playground and premises liability insurance

Most accidents which occur at school are not in any way due to neglect on the part of the school board, nor are they due to any lack of reasonably careful supervision; but there is always the possibility of accidents occurring due to faulty equipment, neglect, or lack of proper supervision. Such accidents may give rise to claims against the school board for damages. To protect themselves against lost as a result of court action, many school boards carry a type of insurance known as Playground and Premises Liability Insurance. Liability insurance does not automatically reimburse the injured just because he sustained injury. The injured must take court action and prove responsibility or neglect on the part of another party, say, a school board. Liability insurance is not to be confused with accident insurance, which reimburses the injured regardless of who was at fault. Accident insurance is paid automatically as a result of an accident; liability insurance is paid on behalf of the insured if he has been sued and proven liable.

Ninety-six per cent of the school boards reported that they carried playground and premises liability insurance. Only one school board reported definitely that it did not carry this type of liability insurance. The fact that school boards tend to carry play-

[22] **Ibid.**
[23] **Ibid.**

ground and premises liability insurance does not prove that the risk of loss due to court action is great; it does, however, indicate that school board members rest easier of mind knowing that, should claims for damages arise, they will have the expert services of the insurance company's adjusters and legal personnel and that they, themselves, will not have to deal directly with the parents. The fact that parents presenting claims for damages must deal through their own lawyers with the insurance company, and not directly with school board members (some of whom they may know) undoubtedly deters many from presenting numerous doubtful claims.

The amounts of liability coverage carried vary from five thousand dollars with respect to a single claim to five hundred thousand dollars with respect to one accident involving several claims.

The school boards reported that they paid $10,430.49 for playground and premises liability insurance in 1954 and that insurance companies paid $45 in settlement of claims arising during the same year. From the figures reported it appears that insurance companies returned in settlement of claims 45 cents out of every 100 dollars that school boards paid in premiums. However, it was also reported that in 1955 a claim for damages had been filed as a result of injuries sustained due to an accident occurring in a playground in 1954.[24] The amount of damages asked for in the claim was ten thousand dollars. Should the courts decide in favor of the plaintiff and award damages to the extent of ten thousand dollars (the case is to come before the court in the Spring of 1956) insurance companies will have paid out practically all of the premiums they received in 1954 in settlement of claims arising out of accidents occurring in the same year. On the other hand, if the plaintiff's claim is not upheld by law, or if the plaintiff is awarded a nominal sum (say, actual expenses) the percentage of premiums returned in settlement of claims arising in 1954 will remain relatively small. School boards will be well advised to follow this case through the courts as the judge's decision will give a good indication of the attitude of Alberta's courts toward school board liability with respect to accidents occurring on school premises.

Respondents were asked to report the total amount paid out by insurance companies on behalf of school boards carrying playground and premises liability insurance during the years 1945-1954 inclusive. Ten school boards reported that insurance companies had paid a total of $3,882 in settlement of claims during the ten-year period under review. Twenty-seven school boards reported that

[24]Notice of claims for damages amounting to $10,000 was filed in 1955 as a result of a playground accident occurring in Rocky Mountain S.D. No. 15 in 1954. The case was still pending in March 1, 1956.

insurance companies had not made any payments during the stated period. The remaining school boards (25.5 per cent) either failed to report or reported that they did not have the necessary information.

On the basis of premiums reported for 1954, the writer estimates that school boards paid approximately one hundred thousand dollars for playground and premises liability insurance during the ten-year period, 1945-1954. The reported amount of claims paid ($3,882) indicates that insurance companies paid out approximately four per cent of the premiums received in settlement of claims arising during the same period. The indicated percentage of premiums paid in settlement of claims may not be correct, since 25 per cent of the school boards failed to report. It may be argued, however, that four per cent is a close estimate of the amount of premiums returned in settlement of claims since respondents would tend to remember large payments and report them.

Pupil accident insurance

Many people fail to make a clear distinction between accident insurance and liability insurance. Liablity insurance is carried to protect the insured against damages assessed by a court as the result of some action, or neglect, for which the insured has been proved to be responsible. Accident insurance, on the other hand, provides compensation for the injured regardless of who was at fault. Accident insurance is usually paid on receipt of a doctor's certificate stating the extent of the injuries sustained. Pupil accident insurance policies insure children only while at school and while going to and from school. School boards may carry pupil accident insurance to reimburse parents for expenses incurred as a result of accidents to children attending school, or the parents themselves may carry accident insurance for their own protection. The number of school boards carrying accident insurance, the premiums paid, and the claims paid, are reported in Table V.

Relatively few school boards, as shown in Table V, carried pupil accident insurance. Those who did carry insurance paid more than four times as much in premiums as the insuring companies did in settlement of claims. The low claim-premium ratio (24 per cent) suggests that accident insurance places an unnecessary financial burden on school boards; the high percentage of school boards who do not carry pupil accident insurance (at least 88 per cent) suggests that school boards should not be carrying this form of insurance at all.

Why do a few school boards carry pupil accident insurance? Parents are concerned about the welfare of their children when

they are away from home. Parents may not give particularly close supervision themselves: they frequently allow their children to play rough games without supervision, drive trucks and tractors, swing in trees, play on the streets, and engage in countless activities around the home and the farm that are more hazardous than school attendance. But when the children are at school, the parents are concerned: they want the children supervised, protected. Parents support the school through taxes, and they feel that, since the children must go to school, they have the right to make certain demands on the school. The demands which parents have made for reimbursement when children have been injured have led some school boards to provide pupil accident insurance. Clearly school boards have the right to carry liability insurance to protect themselves against claims for damages;[25] but the right to carry insurance which reimburses others without furnishing the school board protection is not so clearly defined.

TABLE V

PUPIL ACCIDENT INSURANCE, FIFTY-ONE SCHOOL UNITS, ALBERTA, 1954

	No. school units	Premiums paid	Claims paid by insurance co.'s
School units carrying accident insurance	4	$2,894.40	$690.70
Do not carry accident insurance	45	.....	.....
Did not answer question	2	.....	.....
Total	51	$2,894.40	$690.70

If school boards do not wish to carry pupil accident insurance, what are the alternatives? School boards may point out that school attendance is relatively safe and ignore parental pressure, or they may make provision through their organization for parents to purchase pupil accident insurance on a voluntary basis. That is, school boards may arrange with companies writing pupil accident insurance to distribute through the schools literature describing pupil accident insurance and telling parents how to obtain the insurance. Parents who wish to participate in the insurance plan signify their intention in writing and send the premiums to the school. In this way, pupil accident insurance may be obtained at a cost of a very few cents per month to parents desiring such coverage.

[25] Alberta Department of Education, op. cit., Sec. 175 (c), p. 52.

The provision of pupil accident insurance on a voluntary basis saves the school board considerable expense and, at the same time, throws the onus of responsibility for carrying pupil accident insurance on the parents, where many people believe it belongs.

A general demand for insurance that would reimburse parents for expenses incurred through injury to children attending school has, within the past few months, led several school boards to make provision for parents to purchase pupil accident insurance on a voluntary basis.[26] The growing demand for accident insurance came with the realization on the part of many parents that liability insurance was not what they thought it was. Many parents had been content knowing that school boards carried liability insurance. But when they learned, as a result of asking school boards to remiburse them for expenses incurred due to accident to their children at school, that liability insurance does not automatically pay hospital bills, doctor's bills, and such, they demanded accident insurance. The school boards argued that they should carry liability insurance to protect themselves against claims for damages, that blanket accident insurance policies would be wasteful because some children were already covered by family accident policies. They argued further that since pupil insurance policies were introduced public pressure would force their continuation even if premiums rose beyond an amount school boards were prepared to pay.

As a result of parental demand and school board reasoning, provisions were made for parents to purchase pupil accident insurance on a voluntary basis. At least two purposes were served by the decisions: parents subscribing to the insurance plan were relieved of worries concerning possible expenses in connection with accidents which might befall their children while attending school, and school boards were relieved of embarrassment growing out of situations in which they found themselves in sympathy with the parent of an injured child but unable to provide financial assistance. In view of what appears to be a growing demand on the part of many parents for pupil accident insurance, school boards might give careful consideration to plans which provide parents with an opportunity to purchase pupil accident insurance through the school, at low cost and on a voluntary basis.

Total Cost of Insurance

For insurance of all kinds school boards paid in 1954 more than two hundred forty thousand dollars (Table VI). They received in

[26]Red Deer S.D. No. 35, Red Deer S.D. No. 104, Lacombe S.D. No. 56, Red Deer No. 17, and Rocky Mountain S.D. No. 15 adopted a voluntary pupil accident insurance plan underwritten by Canada Health & Accident Assurance Corporation, Waterloo, Ontario, early in 1956.

settlement of claims arising during the same year less than eighty thousand dollars. In other words, they received a return of less than 33 cents of every dollar invested in school insurance in 1954. On the basis of these figures it would appear that Alberta Division and Country school systems working co-operatively and using current insurance rates could carry their own insurance as a group, pay their members eighty thousand dollars a year in settlement of claims, and still have one hundred sixty thousand dollars a year out of which to build an contingency reserve and pay for the operation of their own insurance bureau. Should Alberta rural school systems not wish to carry their own insurance, they could by pooling their business and acting as a group place themselves in a very strong position to bargain with insurance companies for greatly reduced rates.

TABLE VI

TOTAL COST OF INSURANCE AND TOTAL CLAIMS PAID, FIFTY-ONE SCHOOL UNITS, ALBERTA 1954

	As reported in summary*
Premiums chargeable to 1954 school accounts	$247,932.54
Claims paid to or on behalf of the school system, 1954	78,091.35

*Amounts adjusted for school units not reporting totals in summary.

The cost of school insurance in 1954 represented approximately one per cent of the cost of operation of the school systems reported. While school insurance does not represent a large portion of the annual budget, it does represent a large item of expenditure on which considerable saving could be made without impairment of services. By pooling their insurance business, Alberta School units could provide themselves with expert advice on all school insurance problems, establish a uniform school insurance policy, provide adequate and effective coverage of all school risks insured, and save money at the same time.

Conclusions and Recommendations

The fifty-one Alberta school systems paid nearly one-quarter of a million dollars for insurance of all kinds in 1954. They had returned to them, or paid on their behalf, less than one third of the amount spent for premiums. The insurance experience of Alberta school boards is not unique: similar conditions have been reported for school boards in other parts of Canada and United States. Some of these school boards reduced their insurance costs through

bargaining with insurance companies for lower rates, others through state insurance plans, and still others through self-insurance. The successful experience of school boards who have taken positive steps to cut insurance costs should encourage Alberta school boards to follow careful examination of their own insurance practices with equally positive steps to reduce the cost of their school insurance.

School boards may press for low cost insurance individually or as a group. Group action strengthens their bargaining power; it also reduces duplication of costly services and promotes advantageous procedures not practical for individual school boards. Whether they seek low cost insurance protection individually or as a group, school boards will find many of the recommendations which follow equally applicable.

1. School boards should keep complete and accurate records of their insurance costs and claims.

2. Accurate building and equipment appraisals should be made and kept up to date for fire insurance purposes. Blanket fire insurance policies should be written with eighty per cent co-insurance clauses, and insurance should be kept in force at the contracted amount.

3. Liability insurance, other than that carried on school buses, should not exceed ten thousand dollars for a single claim and fifty thousand dollars for one accident involving several claims.

4. Insurance on school-owned buses should be limited to fire insurance, property damage insurance, passenger hazard liability insurance, and road hazard liability insurance. Insurance on contract buses should be limited to passenger hazard and road hazard liability insurance. Passenger hazard and road hazard liability insurance carried on school buses should not exceed the minimum limits set forth in the Public Service Vehicles Act, and property damage insurance should not exceed five thousand dollars.

5. Liability insurance should be carried on behalf of teachers to protect them against claims for damages arising out of the regular performance of their duties.

6. School boards should not carry accident insurance; but they should make provision for parents to purchase pupil accident insurance through the school, at low cost and on a voluntary basis, without placing undue burden on the teaching staff.

7. All forms of liability insurance carried should be placed through one agency to obtain reduced premiums.

8. All unnecessary insurance coverage should be eliminated.

9. School boards should call for tenders for school insurance business.

The foregoing recommendations are equally applicable whether school boards continue to look after their individual insurance needs or choose to organize so as to deal collectively with their insurance problems. As a group, school boards could pool their insurance business and bargain for reduced rates; or they could form their own company to underwrite their insurance needs. It is with the latter procedure in mind that the writer invites consideration of the following special recommendation.

Alberta Division and County school boards should form their own insurance company. They should hire expert personnel to operate their business, adopt uniform insurance practices, and charge themselves for insurance at the same rates currently charged by stock insurance companies for the first ten years. After ten years of operation, on the basis of the insurance experience reported for 1954, the school boards' company should have acquired a contingency fund of approximately one million dollars. When the contingency fund reaches one million dollars, premiums should be reduced to the point where premiums plus the earnings of the contingency fund balance operation expenses and for any year in which experience justifies it, premiums should be eliminated altogether. The Cincinnati school boards who operated their own fire insurance plan proved that premiums could be eliminated. There is every reason to believe that Alberta school boards could, through self-insurance, eventually eliminate insurance premiums on all forms of insurance they are obliged to carry.

BIBLIOGRAPHY

Alberta Department of Education. *An Act Respecting Schools.* Edmonton, Queen's Printer, 1951.

Alberta Department of Highways. *The Public Service Vehicles Act and Regulations.* Edmonton, Queen's Printer, 1949.

Edwards, Newton. "Court Decisions". *Encyclopedia of Educational Research* (1950), pp. 1095-6.

Holy, T. C. and Herrick, John H. "School-plant Insurance." *Encyclopedia of Educational Research* (1950), p. 1117.

Noble, M. C. S. *Pupil Transportation in the United States.* Scranton, Pennsylvania, International Textbook Company, 1940.

Reeder, W. G. *The Fundamentals of Public School Administration.* New York, The Macmillan Company, 1950.

THE ADMINISTRATION OF HIGH SCHOOLS IN ALBERTA DURING THE TERRITORIAL PERIOD, 1889-1905

B. E. Walker
Faculty of Education
University of Alberta

Emerging Pattern of Public Control

The earliest pattern for the control of secondary education in western Canada was private and denominational. In Manitoba fully organized secondary school programs were offered in the 1860's in St. Boniface College (Roman Catholic) and St. John's College (Anglican). The first secondary schools established in the North-West Territories after Manitoba was separated from the Territories and made into a province were also under private control. The Reports of the Board of Education published in the 1880's refer to certain private secondary schools operating in the territories—for example, the Roman Catholic Convent Schools at Prince Albert and Calgary, and the Presbyterian High School at Prince Albert.[1]

A pattern of public control of secondary education gradually emerged in western Canada during the last quarter of the nineteenth century. The public high school at Victoria dates from 1876. The publicly supported collegiate institute at Winnipeg was establish in 1882.

It is difficult to determine exactly when the first classroom instruction at the secondary school level was given in Alberta. It is possible that one or two private denominational schools offered some secondary school subjects before any public schools were organized to offer instruction at the high-school level. Probably some of the public schools in the early years of their graded school organization offered some high school subjects before they had a high school in name or in organization.

The first fully organized high school departments in the province of Alberta were established in Calgary. With the coming of the railway Calgary replaced Edmonton as the main trading and educational center. About five years after the railway began to serve Calgary and the surrounding district, the town had grown to the point where it had two fully organized high school departments, one in the Protestant Public School District, and the other in the Roman Catholic Separate School District.

Calgary Protestant Public School District Number 19 was organized in 1885. In the same year the school population was large

[1]Board of Education, N.W.T., **Annual Reports: 1886-87**, p. 14; **1888-89**, p. 11.

enough to require the services of two teachers. Four years later Calgary Public School District operated a four-room school. James Short, principal of the school, organized and taught a high school department. Beginning with the summer school quarter in 1889 Calgary Public School District received the union high school grant.[2]

The early development of the Calgary Roman Catholic Separate School District closely paralleled that of the Calgary Protestant Public School District. In 1885 the Sacred Heart Convent operated by the members of the Congregation of the Faithful Companions of Jesus became part of the newly established Lacombe Roman Catholic Separate School District Number 1 (Calgary). By 1889 Mother Greene had three assistants on the staff of the Convent School and she herself specialized in offering instruction at the secondary school level. Beginning with the autumn school quarter in 1889 Calgary Separate School District received the union high school grant.[3]

Other towns soon followed the lead of Calgary in establishing high school departments. In the 1890's high school instruction was offered in the senior rooms of the public schools at Medicine Hat, Lethbridge, Edmonton, and Strathcona.[4] Shortly after the turn of the century high school departments were organized in several other towns, including Wetaskiwin, Red Deer, Lacombe, Cardston, and Macleod. When the new province of Alberta was formed in 1905, public control of secondary education was emerging as a dominant pattern.

Upward Extension of the Public School System

The first high schools in Alberta arose as a gradual expansion upward of the common schools. Students in the common schools were classified into "standards" on the basis of their progress through the school readers. Students reading from the first reader were grouped in standard I, those reading from the second reader were grouped in standard II, and so on. Students who progressed beyond the elementary school readers could read from the high school reader and were grouped in a high school standard. Standard VI was the first high school standard added to the elementary school program. For a brief period beginning in 1890 standard V was included with the high school standards. By the end of the territorial period the high school program consisted of three standards (VI, VII, and VIII) superimposed on the elementary school program.

2Ibid., 1889-90, p. 33.
3Ibid., 1889-90, pp. 46, 84.
4Ibid., 1890-91, pp. 13, 33, 38.

The early high schools of the North-West Territories were continuous with the elementary schools, not only with regard to program of study, but also with regard to administration. The same district school board administered all the departments in the school from primary to high school. The school board appointed a staff of teachers, one of whom was made the principal teacher of the whole school. The pattern established from the beginning was for the teacher in the high school department to serve as principal of all departments from primary to high school. The school was periodically visited by a government school inspector who inspected all the rooms of the school. Almost invariably the early high school had no building of its own, but was merely a room in a graded school building designated as the high school room.

The organization of the public high school at Calgary is a good example of the early pattern of continuity in the administration of the elementary school and the high school. For the school quarter ending March 31, 1889, the Calgary Public School Board engaged the services of four teachers to offer instruction in all the standards from primary to high-school level. Misses Wheelan, Cowan, and McIntyre taught the elementary school standards. Mr. Short taught the high school branch and served as headmaster or principal of the whole school. All four teachers and their pupils were housed in a four-room school building which had been constructed two years previously. All rooms from primary to high school level were visited by the same inspector. The organization adopted in Calgary became the pattern for years to come in villages and towns where school programs were extended upward to include high school.

Legal Sanction for Public Support

Beginning in 1886 the Board of Education in the North-West Territories made several appeals to the Territorial and Dominion Governments to provide financial support for public high schools. The Dominion Government gave little encouragement, taking the stand that private secondary schools were already established in the Territories, and that the benefits accruing from such schools should be "fully ascertained before the question of granting assistance to public high schools be considered."[5]

The lack of encouragement from the Federal Government did not deter the leaders in the North-West Territories from carrying out their plans to establish public high schools. The Board of Education renewed its appeal to the Territorial Government to add to the School Ordinance a clause which would encourage public school districts to establish high school branches in their schools.

[5]N.W.T., **Journals, 1887, Appendix G.**

Finally in 1888 the North-West Assembly inserted in the School Ordinance the sections which gave a firm legal basis for the public support of high schools:

> 177. To schools in which the daily average attendance is not less than sixty pupils, when not less than three teachers are employed, and when not less than fifteen pupils, in regular attendance at any one such school, have passed the examination prescribed by the Board of Education for entrance to the High School Branch of such schools, a grant of $350 in addition to the grants to which the school is otherwise entitled, may be made annually to such school for high school teachers, provided the certificates held by such teachers are approved by the Board of Education; provided always that in any two adjacent school districts jointly fulfilling the requirements, a "Union School" may be established in either district, at the discretion, and under the management of the trustees of both districts.
>
> 178. The Board of Education shall prescribe a course of studies for use in the High School Branch of such schools and it shall be obligatory on the part of the Trustees of such schools to provide suitable accommodation and all necessary school apparatus for the use of the pupils.
>
> 179. The Board of Education may, under regulations prescribed by them, authorize the establishment of a Normal Department in any such schools, and the Trustees of any such school shall thereupon establish such Normal Department.
>
> 180. Such schools shall be known as Union Schools.[6]

Pursuant to the instructions contained in the above sections of the School Ordinance, the Board of Education at its meeting in March 1889 adopted provisional regulations relating to the entrance examinations, the course of studies, and other matters affecting high school branches of union schools. The *Annual Report* of the Board of Education for the following year contained a complete set of regulations relating to the operation of union schools.

The revised and consolidated School Ordinance of 1892 set forth in considerable detail the conditions to be fulfilled by union schools. These conditions were practically the same as those contained in the original legislation prepared four years previously, with the exception of one new condition: "where Union Schools are established, the High School Department of such schools shall be non-sectarian." The insertion of this proviso reflected the trend towards secularism associated with the transition from dual control by the sections of the Board of Education to unified control by the Council of Public Instruction. This early attempt to make separatism illegal at the high school level was not successful. The proviso was repealed in the following year. Separatism continued to be an established legal principle at the high school as well as the elementary school level.

All clauses relating to union high schools were deleted in the revised and consolidated School Ordinance of 1896.[7] Two main

[6] N.W.T., **Ordinances: 1888, ch. 59.**
[7] **Ibid., 1896, ch. 2.**

developments were probably responsible for this early termination of the legal history of union high schools in the North-West Territories. In the first place the withdrawal of the union school grant made all the detailed legislation regarding such schools pointless. In the second place the union high schools were failing with respect to their *raison d'être,* the professional training of teachers. The establishment of a permanent normal school in Regina and the holding of short normal sessions at intervals in other centers meant that the Council of Public Instruction was giving up attempts to carry out professional training programs for teachers in close association with high school branches of union schools.

Although the revised School Ordinance of 1896 contained no reference to union high schools, it contained several sections which seemed to give legal sanction to the expansion upwards of the public school system to include instruction at the secondary level. Section 6c stated that it was the duty of the Council of Public Instruction "to define by standards the studies to be pursued in all schools, such Standards to be numbered from I upwards, standards above Standard V to be further denominated High School Standards." Section 113e provided a special grant of seventy-five dollars per term for any high school complying with the provision of the Ordinance and the regulations of the Council of Public Instruction. Other sections in the Ordinance relating to programs of study and tuition fees sanctioned instruction in public schools at the high school level.

The provision of a legal basis for the public support of high schools in the North-West Territories followed the pattern in older settlements on the continent. In certain provinces of Canada, and in various states of the United States, legislatures at first passed laws which provided a legal basis for the public support of a system of common schools. Since it seemed to be the wish of the people that these common schools extend their grades upward to include the high school grades, the legislatures and the courts tended to give a broad interpretation to the term "common school," and to consider that the high school was a part of the common school system. Important legislative enactments such as the Ontario School Act of 1870-71, and well-known court cases such as that at Kalamazoo, Michigan, in 1874, helped to dispel doubts regarding the legality of using public funds for support of high schools. The School Ordinances passed by the North-West Assembly in 1888 and 1896 helped to establish the legality of public support of high schools in the Territories. During the nineteenth century in the New World the pattern of educational development was towards an ideal of a

free and universal system of public schools extending from elementary to secondary level.

Financial Support by the Territorial Government and the Towns

The Government at Regina and the local school districts shared in the financial support of public schools in the North-West Territories. When the public school program was extended upward to include high school subjects, the Government and the local districts shared in the cost of operating high school classrooms.

In that late 1880's the Government at Regina paid about half the cost of operating public school classrooms. The basic classroom grant for all levels of instruction was fixed at 75 per cent of the teacher's salary. In 1892 there was a change in the school grant structure which had the effect of reducing the government share of the financial support of the high schools. In that year the North-West Assembly experienced difficulty in administering the school grants because the Federal Government appropriations were not large enough to pay grants according to the usual formula. The Assembly therefore adopted a new policy of providing a flat grant for all classrooms, thereby reducing the basic classroom grant for high school rooms. In 1901 there was another change in the school grant structure which had the effect of lowering still further the government contribution to the support of high schools. The basic classroom grants for rural districts were increased and those for village and town districts decreased. Since the high school rooms were in the village and town districts, this meant that the Government at Regina paid a decreased share of the cost of the high schools, and the villages and towns an increased share.

A noteworthy feature of territorial school finance was the variety of special grants devised by the Government at Regina to stimulate local districts to offer advanced instruction. A union high school qualified for $350 per year in addition to all the other grants to which the school was entitled. Only the larger public schools at Calgary, Regina, Moose Jaw, Moosomin, and Prince Albert had high school branches large enough to meet the requirements of this grant. Smaller centers, like Lethbridge, Medicine Hat, and Edmonton, which had low enrollments in the upper standards, received no special aid at all. In an effort to make the stimulation grant available to centers of all sizes, the North-West Assembly withdrew the union school grant and provided a special capitation grant of eighteen dollars per year for every pupil enrolled in a standard above III. In 1896 this capitation grant was withdrawn in favor of a new form of stimulation grant. The Government made available a subsidy of $150 per year for each high school, defined for grant

purposes as the department of a public school having at least two high school teachers and an average daily attendance of at least forty pupils in high school standards.[8]

External examinations were associated with each of the above forms of stimulation grant. Evidently there was concern lest local school authorities promote pupils more rapidly than was justified. An external examination decided admission of pupils to the high school branches of union schools. When the special capitation grant was in force, the Government tried to administer a cumbersome system of external examinations for all standards from III upwards. Finally the external standard V examination was retained to decide admission of pupils to high school.

The per pupil cost in senior rooms in territorial schools was relatively high. The enrollments in these rooms were usually small, and the salaries of the high school teachers were much higher than those of teachers in junior rooms. Tables I and II, which represent typical arrangements, reveal that the per pupil cost of operating high school departments was much greater than the per pupil cost of operating elementary school departments.

TABLE I

CLASSROOM ENROLLMENTS AND TEACHER SALARIES, CALGARY, 1891*

Standards in the classroom	Room enrollment	Annual salary of teacher
High school	35	1200
IV	54	800
III	52	600
II	67	600
I Senior	57	600
I Junior	34	600

*Data for Calgary Public S.D. No. 19, from *Annual Report*, Board of Education, N.W.T., 1890-91, pp. 20-23.

The Territorial School Ordinance permitted school boards to charge fees for high school students. If a school board maintained a high school as defined by the Ordinance, the board might levy high school fees not exceeding fifteen dollars per year per pupil. The law permitted school boards to charge these fees in those cases in which the parents or guardians were resident ratepayers of the

[8]N.W.T., **Ordinances**: 1888, ch. 59; 1892, ch. 22; 1896, ch. 2.

school district. It appears that few school boards did actually charge fees for high school pupils whose parents or guardians resided in the district, despite the legal permission to do so. Most people in the North-West believed that secondary education should be free in the fullest possible sense of the word.

TABLE II

CLASSROOM ENROLLMENTS AND TEACHER SALARIES, EDMONTON, 1898*

Designation of room	Room enrollment	Annual Salary of teacher
High School	16	1200
Intermediate	50	800
Junior	41	600
Junior	47	600
Junior	65	600

*Data from unpublished minutes, Edmonton Public S.D. No. 7, February 2, 1898.

Although the general sentiment of the people of the Territories was in favor of public support of secondary education, there was one community at least in which the matter became a controversial issue. The policy of using public funds to furnish instruction at the high school level was strongly criticised in 1897 by certain members of the Medicine Hat School Board. Three years later the issue of public support of the high school again came to the fore in a meeting of the Medicine Hat School Board, and this time the opposition was sufficiently strong to carry a motion that no further classes be undertaken higher than that equivalent to "Public School Leaving". A few months later the Medicine Hat School Board rescinded this motion. Although the Medicine Hat School Board had finally accepted the principle that public funds should be used to support a high school, it had not yet accepted the principle that the high school instruction should be free to the students. In 1902, after the high school department in Medicine Hat had grown large enough to permit the charging of tuition fees as provided in the School Ordinance, the Board decided to charge all high school pupils a fee of seven dollars for the first term and five dollars for the second term.[9]

[9]Medicine Hat Public S.D. No. 76, unpublished minutes, 1897-1903, passim.

Territorial high schools derived their financial support from the two main sources of government subsidy and local taxation. As the Government contributed a decreasing share of the cost of operating these schools, the townspeople had to assume an increasing share of the burden. Because per pupil costs were high, and because towns had to assume an increasing share of the burden, some individuals challenged the principle of public support of secondary education. However, the overwhelming sentiment of the townspeople was in favor of full public support of secondary education. Practically all towns and villages pressed forward with organization of high school departments which would provide free instruction for youth.

Summary

Political and social factors in the North-West Territories favored establishment of the public high school as the dominant type of secondary institution. In the School Ordinance of 1888 the North-West Assembly provided legal sanction for public control and support of secondary education. In the following year fully organized high school departments were opened in Calgary. The first high schools in Calgary and other territorial towns developed as an extension upward of the public school system. The Territorial Government and the towns shared in the cost of maintaining public high schools, with the towns paying an increasing proportion of the cost.

Important precedents regarding the organization of public secondary education were established during the territorial period. The territorial high school system provided the framework for the high school expansion which was to take place in the new province of Alberta in the decades to come.

BIBLIOGRAPHY

Board of Education, North-West Territories. *Annual Reports,* 1885-1891. Regina, Printer to the Government of the North-West Territories.

Calgary Public School District No. 19. Unpublished minutes, 1889-1905.

Council of Public Instruction, North-West Territories. *Reports,* 1896, 1898, 1900. Regina, Printer to the Government of the North-West Territories.

Department of Education, North-West Territories. *Annual Reports,* 1901-1904. Regina, Printer to the Government of the North-West Territories.

Edmonton Public School District No. 7. Unpublished minutes, 1889-1905.

Lethbridge Public School District No. 51. Unpublished minutes, 1889-1905.

Medicine Hat Public School District No. 76. Unpublished minutes, 1897-1905.

North-West Territories, *Journals of the Council of the N.W.T.,* 1887.

North-West Territories, *Ordinances,* 1888-1901.

THE RURAL HIGH SCHOOL IN ALBERTA

RALPH L. MCCALL
Acme, Alberta

On April 19, 1921, the Legislature assented to the Secondary Consolidated School Act. This Act stated that:

> Two or more adjoining school districts of any kind may consolidate—by the formation of a new district for the purpose of establishing and maintaining therein a school or schools for the education of pupils who have completed grade VII or grade VIII of the Public School Course as classified by the regulation of the Department of Education, and a district so formed shall be known as a secondary consolidated school district.[1]

Subsequently the Secondary Consolidated School became commonly known as the Rural High School.

Sources of Information

Although the Rural High School began and ended within comparatively recent times, some of the story has already been lost. Much of the information for the present study had to come from the rural areas that had been served by such schools: from divisional secretaries, superintendents, teachers, students and others.[2] Further information was given by eight former secretary-treasurers as well as many trustees, teachers, and pupils of the Rural High Schools. Among the valuable documents located were seven minute books, a number of registers and cash books, two detailed sets of files,[3] and several government pamphlets and reports. In all, thirty questionnaires were answered and four interviews granted.

Historical Background

After World War I the population trend was to the city. But whether rural youth stayed on the farm or found a new place for itself in urban society, the necessity for a high school education became apparent.

Previous to 1921 a complete high school education was available only in cities and larger towns. Villages and rural schools frequently offered some training beyond grade VIII, but conditions were seldom satisfactory. Consolidated schools, which included all grades, had been in existence since 1913.[4]. They usually provided some high school, but the regulation stated that pupils must be provided with

---

[1] **Statutes of Alberta, 1921. p. 233.**

[2] Grateful acknowledgement is here made of the encouragement and assistance of Mr. Harry Sweet, and of the librarians in the Department of Education and the Legislative libraries.

[3] **Rockyford R.H.S. No. 3, and Kathyrn R.H.S. No. 7.**

[4] **I. Goresky, The Beginning and Growth of the Alberta School System, p. 112.**

transportation forced a sharp increase in taxes. In Central and Northern Alberta roads and weather were further deterrents to consolidation, and thus in the more populated areas the two-room rural school proved to be most popular. Wherever high school was taught the Government gave special grants, and in 1919, as a further encouragement to students, the Government increased grants and abolished the right of school districts to charge fees to high school students from outside districts.[5]

However, in spite of government measures in education, young people in rural areas were still decidedly handicapped. The Deputy Minister of Education, John Ross, reported to the Minister that more and more farmers were agitating for a rural high school in order that their children might secure secondary education within reach of their homes. Thus in 1921 the experiment began.

Legislation

The idea of the Rural High School seems to have arisen from the efforts of Alberta educators to keep the advantages of a consolidated school while avoiding the criticisms of consolidation. At the end of 1921 J. T. Ross summarized the organization as follows:

> The Secondary Consolidated School Act, which was passed by the Legislature, gives authority to two or more districts to unite for the purpose of organizing a rural high school. The consolidated district is administered by a board of trustees that is selected by the board of trustees of each unit appointing one of its members to act as its representative on the school board of the consolidated district. The money required to operate the school is raised by a tax levied on all the taxable property in each district, each district contributing in proportion to the assessed value of its property, and a grant of $4.00 per day from the Government. The grades taught in the school must be those above the seventh, and should include the eleventh.[6]

The legislation reduced the cost of consolidation by not providing transportation for school students, who were thought to be old enough to provide their own means of transportation. Furthermore, rural folk would no longer have to bear the expense of sending their children away to school, and more important, the children could have the satisfaction of living at home. The need for dormitories and boarding places for more distant students was of course foreseen.

The Rural High School in Operation

Location

Strangely enough, in practice the Rural High School was seldom rural. Of the nineteen school districts organized under the Act, only two schools were built without a village or hamlet as a centre.[7]

---

[5]In 1922 the Legislature voted to permit a monthly fee of three dollars for non-resident pupils enrolled in grades above VIII.

[6]**Annual Report of the Department of Education, Alberta, 1921, pp. 12-13.**

[7]Angle Lake R.H.S. No. 6 and Splan R.H.S. No. 12.

Ironically, the only school district to be dissolved before the coming of the school division was Angle Lake, one of the two truly rural schools.

Forming Districts

As the map (Figure 1) shows, response to the Rural High School Act was not extensive. Inspectors' reports for the next few years indicate that many rural areas were interested in a Rural High School, but objections arose mainly from the fear of increased taxation especially by taxpayers who had no children. The high school inspectors' report of 1922 stated:

> In some centres the provision of free education beyond grade VIII is being seriously questioned, and the claim is made that the State and the ratepayer in general have done their duty when they have provided free educational facilities to the end of the so-called Public School Course.[8]

A further blow to the Rural High School movement was the legislation granting fifty cents per day for one-room rural schools teaching beyond grade VIII. In spite of protests from inspectors that teachers would be unable to handle the increased burden satisfactorily, the teaching of high school in rural schools increased sharply. Thus where Rural High Schools were organized there was either a strong community spirit favoring education, or forceful personalities guiding events.

Villages and hamlets were best suited to take advantage of the Rural High School Act. Often the high school population did not warrant a separate room nor were local finances thought sufficient to build an extra room. Thus when surrounding rural districts were willing to share in the costs and advantages of higher education, the Rural High School was established. Sometimes Department of Education officials discouraged poorly organized districts, but on the other hand they campaigned actively in promising high school areas.

Formation of Districts

To form a Rural High School District the Inspector of Schools and the trustees from the school districts involved had to submit a detailed plan of their proposal to the Minister of Education. The Department would then send a representative to investigate the matter further and to give assistance and advice. If conditions proved satisfactory, 25 per cent of the resident ratepayers of each district had to sign a petition asking for high-school consolidation. A vote was then taken over the petitioning districts as a whole, except for village or town districts. A majority vote was required. If the rural districts voted in favor of a Rural High School, a town or village board to be included merely passed a resolution approving

[8]**Reports of the Department of Education, Alberta, 1922.**

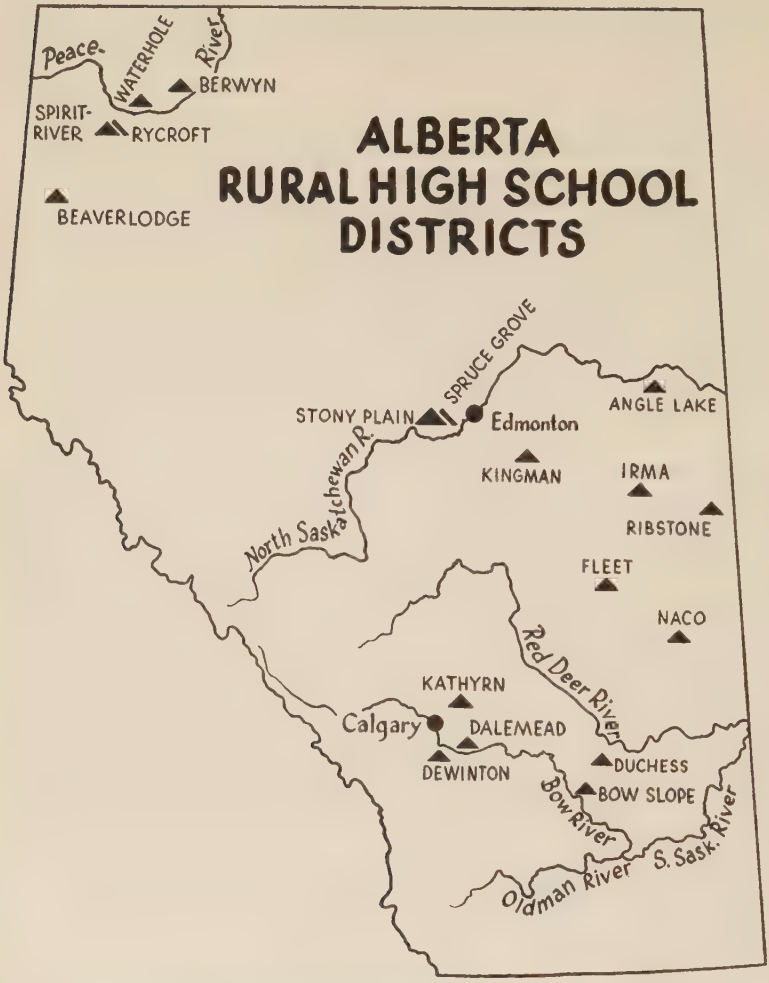

FIGURE I

▲ HIGH SCHOOL DISTRICTS

1. Irma, 1921-40
2. Fleet, 1921-39
3. Rockyford, 1926-45
4. Dalemead, 1926-39
5. Naco, 1926-45
6. Angle Lake, 1927-33
7. Kathyrn, 1927-39
8. Kingman, 1927-38
9. Waterhole, 1927-44
10. Berwyn, 1928-44
11. Bow Slope, 1929-39
12. Splan, 1929-39
13. Spirit River, 1929-45
14. Beaverlodge, 1930-47
15. Dewinton, 1930-39
16. Duchess, 1930-44
17. Spruce Grove, 1933-39
18. Ribstone, 1935-39
19. Rycroft, 1938-40

or disapproving consolidation, and gave public notice thereof. A petition by any twenty-five resident ratepayers of a town or fifteen resident ratepayers of a village could force a vote to be taken. In such cases a majority vote was needed in the village or town for approval of the school board's action.[9]

In practice, the number of school districts taking part in the Rural High School varied from nine at Waterhole[10] to two at Angle Lake. The average was four or five. The farthest average distance a pupil travelled to school was approximately seven or eight miles, although Beaverlodge reported a maximum of sixteen miles.[11]

Sometimes the presence of Separate Schools within the area complicated matters, although the different districts might work together.[12] Occasionally a school district became disgruntled and attempted to secede from the union.[13] Since the loss of taxable land might seriously endanger the whole organization, government officials usually helped to keep it intact.

Accommodation

The Department of Education had different sets of plans for the building of Rural High Schools, but the use of other buildings was permitted so that taxes would not be too high at first. The first classes often began in such structures as a Methodist Church building at Irma, community halls at Angle Lake and Waterhole, a former house at Bow Slope, and a C.P.R. bunkhouse at Kathyrn. Usually these accommodations were merely temporary, although one inspector's report suggested the need to force some schools out of temporary quarters. Usually, however, the Rural High School rented a room in the Public School building or else built a new school.

The unsuccessful venture at Angle Lake was a direct result of lack of accommodation. Their new community hall, made of local lumber by a cooperative community, proved too cold for habitation, and school was discontinued at Christmas. Thus Angle Lake operated from September to December in 1927, although records show that the Rural High School District was not dissolved until 1933.

Enrolment

Most Rural High Schools had an attendance of more than fifteen pupils with an average enrolment of approximately twenty-five.

9**Statutes of Alberta, 1921, pp. 233-237.**

10**Fairview.**

11**Rural High Schools in Alberta, p. 19.**

12**Rockyford R.H.S. No. 3 was limited in area by both a Catholic Separate School and a Hutterite School.**

13**For example, Landseer in Rockyford R.H.S. No. 3 and Dalroy in Kathyrn R.H.S. No. 7.**

Some schools included grades as low as VIII while other included XII. Inspectors felt that grade XII in most cases was too great a load for a one-room high school, and some boards felt that where grade XII was taught the students of that grade should pay special tuition fees. When the high school became a two-room school such as at Waterhole, Berwyn, and Beaverlodge, grade XII pupils were readily accepted.

Finance

The Government grant to the Rural High School was four dollars per day for each day the school was open, provided that an average attendance of fifteen pupils was maintained. School files indicate that in practice this grant was seldom if ever withheld because of insufficient students. In addition there were special grants for such things as science equipment and libraries. In 1933, as a result of the depression, grants were paid for 180 days instead of the usual 200 days, and in 1936 the figure of 200 days was restored but the grant per day was reduced to three dollars and sixty cents.[14]

Local school taxation was based on the assessed valuation of property, although some areas began with taxes on an acreage basis. The Rural High School board budgeted for the year and then requisitioned each school district according to its assessment.[15] In most districts the tax levy was seldom more than two mills, although in lower assessment areas such as Naco and Bow Slope the tax went as high as four mills. Of course, the more districts included in the Rural High School the lower the tax rate was likely to be. However, in the case of Naco R.H.S. No. 5, districts outside a ten mile radius were given special consideration. There was agitation in some districts that the taxes to be paid by each district should be relative to the number of students attending school, but the idea was never implemented.

The Minister of Education estimated in 1930 that the average annual cost of maintaining a Rural High School in that year was $2,400, and that of this amount the Government paid one-third—or $800 per year in grants.[16] Generally the average cost per pupil for education in the Rural High School was less than the average cost per pupil in city and consolidated schools.[17]

Collecting taxes sometimes proved difficult. In 1928 Kathryn R.H.S. took action against a local school district for not payinig its requisition, but the matter was settled out of court. However,

14**The Schools Grants Act, 1933 and 1936.**

15In 1931 the municipality was made a collection agency. (See **Taxes and Collection Act, 1931.**)

16**Rural High Schools in Alberta,** p. 12.

17See the Comparative Cost Tables in **Annual Reports of the Department of Education, 1921-1945.**

when Rockyford R.H.S. wished to take action against a delinquent municipality, the school board found that the School Assessment Act of 1931 gave them no power to do so. Taxes were collected by the municipality and turned over to the local school district which in turn paid the Rural High School District. With the consent of the Minister the local school district could take legal action against the municipality, but the Rural High School could sue neither. Mr. C. R. Walrod, secretary-treasurer of the Rockyford R.H.S., stated in a letter to the Minister of Education, "we doubt the legal status of any contract a Rural High S.D. should sign when they have absolutely no collectable claims to their own requisition". After much correspondence, the Minister stated that owing to the prevailing disturbed conditions nothing should be done.

Tuition Fees

Originally the Rural High School was not permitted to charge tuition fees, but in 1922 a fee of three dollars per month for non-resident pupils was permitted. Sometimes students would come to a Rural High from distant as well as adjacent points. Record books indicate that attempting to collect fees was perhaps the most annoying feature of administration.

Facilities

Fleet Rural High School began with homemade desks, the pupils providing their own chairs. Many other schools had as humble a beginning. Nevertheless, as time progressed reports show that facilities in rural high schools were generally satisfactory.

Teachers

Seldom were there complaints about the qualifications of teachers in Rural High Schools. High School teachers were usually plentiful during the period of the Rural High. As usual, the suitability of some teachers was questioned.

Living Accommodations for Students

One of the defects of the Rural High School was a lack of living accommodations for pupils. Except at Duchess no dormitory was provided by the school board. Some areas such as Rycroft were fortunate in having religious organizations[18] that provided room and board for students. Boarding at local homes was the most common. At Naco parents often moved to town in bunk-cars for the winter.

Reasons for Discontinuation

Only one Rural High School, Angle Lake, discontinued operations for reasons other than the coming of the school division. Proponents

[18]For example, the Sisters of Service.

of the Rural High often voiced strong opposition to the division. When in 1929 Perren Baker suggested the idea of divisions with a provincial wide system of taxation, the Rockyford taxpayers stated in a brief submitted to the Provincial Legislative Assembly:

> If a settler choose to file on a mountain top or on an island in the centre of a lake are the taxpayers expected to educate his children—? Will the Hon. Mr. Baker or someone else tell us where (he) can possibly see justification in penalizing one section of the province and subsidizing another section. It is but the Irish Home Rule Bill in another guise being fostered upon the people of Alberta to the detriment of the few unjustly assessed municipalities.[19]

The Rockyford brief went on to say it would be a profitable investment for the Government to move poorly located settlers to a more reasonable location. But in 1935 Fairview taxpayers objected to the idea of a division on the ground that they would be forced to pay for the education of homesteaders' children who had been moved there by the Federal and Provincial Governments.[20]

In 1935 the Social Credit Party swept into power under Mr. Aberhart, who as Minister of Education put into effect the dream of his predecessor Perren Baker. Following the report of a Legislative Committee on rural education, the Legislature empowered the Minister of Education to set up divisions without a vote of the ratepayers. In 1936 eleven divisions were formed.

The Rural High School districts were caught in the new wave, and although they struggled they were eventually overwhelmed. Only towns and villages had a choice. They could join the division, operate the school and let divisional students pay fees, or let the division operate the school and let the town and village students pay fees. However, the only permanent solution was for the towns and villages to join the division. Those that joined had an opportunity to become centralized schools, but those that stayed out generally stagnated.

For a number of reasons (convictions, sentiments, or both) many officials of the Rural High School never accepted the idea of the superiority of the divisional system.

Evaluation of Experiment

The Rural High School experiment cannot be branded a failure. Graduates of these schools today include research chemists, lawyers, doctors, superintendents of schools, and teachers, as well as hundreds of others whose lives were enriched by a high school education which they otherwise would not have had. The experiment developed community leaders who were strong and capable—as they had to

[19]Rockyford R.H.S. files dated February 2, 1929.
[20]Minute book, Waterhole R.H.S. No. 9 (January 21, 1938).

be if the project was to succeed. Furthermore, it might be argued that the Rural High School promoted greater community interest in local educational affairs than does the present division. A former secretary expressed this feeling when he said of the Rural High School:

> All the school's problems were definitely the problem of a local people, not a job to be passed up by some one a million miles away as far as his knowledge or responsibility to local conditions is concerned.[21]

Still, the Rural High School did not take root and spread quickly enough. Meanwhile the need of a coordinated attack upon education covering large areas was obvious. Progress had brought better roads and better transportation. Centralization of schools was now more feasible. The dormitory or boarding place could be replaced by the school bus. The municipality in the rural areas was already the taxing agency, and for the sake of administration and efficiency the larger unit seemed the remedy. Perren Baker had made consistent attempts at centralization but failed. In 1935, with the election of the new government, educational leaders took a stronger hand. The era of the Rural High School was over.

BIBLIOGRAPHY

Alberta Gazettes, 1920-1946.

Annual Reports of the Department of Education, Province of Alberta, 1920-1946.

Goresky, I. *The Beginning and Growth of the Alberta School System.* Unpublished Master's Thesis, University of Alberta, 1944.

Rural Education in Alberta. Report submitted by the Honorable Perren Baker. Edmonton, King's Printer, 1929.

Rural High Schools in Alberta. Edmonton, King's Printer, 1930.

The School Act, The School Assessment Act, The School Grants Act, 1920-1945.

Statutes of Alberta, 1921.

What is and What Might Be in Rural Education in Alberta. Edmonton, King's Printer, 1935.

Collected newspaper reports of legislative activity, 1921, to be found in the Library of the Alberta Legislative Assembly.

Files of Rockyford Rural High School No. 3, and Kathryn Rural High School No. 7.

[21]Letters from G. R. Davel, Fleet R.H.S.

AN EVALUATION OF ARITHMETICAL COMPETENCE IN THE JUNIOR HIGH SCHOOLS OF LETHBRIDGE

Stephen Benjamin Peta
Lethbridge, Alberta

The Problem

The needs of children in the complex society of today necessitate a constant evaluation of all aspects of the educational program. Arithmetic is an integral part of our curriculum. One purpose of this study is to measure the levels of achievement in arithmetic of grades VII, VIII, and IX of the junior high schools of Lethbridge. Another purpose is to evaluate the adequacy of the arithmetic program, and to determine areas of strength and weakness in each of the grades under study. Further, the investigation is bound to yield information concerning the efficiency of the testing instruments.

Experimental Design

In planning a sound experimental study due consideration must be given to problems of sampling, testing instruments, experimental procedures, analysis of data, and the interpretation of findings.

Various techniques have been devised for obtaining a sample which will be representative of its population. H. E. Garrett[1] states that the most trustworthy way of securing representativeness is to make sure that the sample is random. The next requirement is sample size. The larger the sample the more truly it mirrors the characteristics of the population or supply. In this study both of these considerations have been kept in mind in the effort to insure that a reliable and representative sample was chosen. The total population of the junior high schools of Lethbridge was: grade VII—350, grade VIII—340, grade IX—280. As these groups were too large to work with, a random sample of approximately 150 was chosen from each grade. When the pupils had been numbered the sample was selected from the total population according to Fisher's[2] table of random numbers. Since it would have caused considerable inconvenience to the teachers of the Lethbridge junior high schools if the tests had been administered to selected students only, arrangements were made to test all the pupils in each class. This procedure permitted the tests to be given in a normal classroom atmosphere. The tests were scored according to the keys supplied by the test makers.

---

[1] H. E. Garrett, **Statistics in Psychology and Education, p. 202.**
[2] R. A. Fisher and F. Yates, **Statistical Tables.**

Two testing instruments were used to measure the arithmetical competence of the students of the junior high school. In this way it was hoped that a more thorough investigation could be carried out. The Hundred Problem Arithmetic Test (Form V) and the California Arithmetic Test (Intermediate Form AA) were used. Frequency tables were compiled from the resulting scores for each of the five subsections and the total for the Hundred Problem Test, and for each of the eight subsections and total score for the California Arithmetic Test. The mean and standard deviation for all total scores, and scores for sections and subsections of both tests were then computed.[3] The significance of difference between the means of grade VII and grade VIII, of grade VII and grade IX, and of grade VIII and grade IX for each score was then computed in the following manner. The standard error of the mean was calculated using formula $\sigma_M = \frac{\sigma}{\sqrt{N}}$. The standard error of the difference between the two means was calculated using formula $\sigma_D = \sqrt{{\sigma_{M_1}}^2 + {\sigma_{M_2}}^2}$. The critical ratio was obtained by dividing the difference o fthe two means by the standard error o fthe difference: $C \cdot R = \frac{D}{\sigma_D}$. The critical ratio was then tested against the *t* table. The null hypothesis was rejected at the .05 and .01 levels of confidence.[4] A comparison of the achievement of grade VII, grade VIII, and grade IX with the test norms was then completed.

The Testing Instruments

The Hundred Problem Arithmetic Test has two forms, Form V and Form W. The one hundred items of each test are arranged in five sections; addition—ten items, subtraction—ten items, multiplication—fifteen items, division—fifteen items; and fractions, decimals, and per cent—fifty items. This test is recommended for use in grades VII to XII inclusive. It is easy to administer, requiring a total of forty minutes. The authors claim that it not only measures numerical facility, but is so constructed that it minimizes extraneous factors such as verbal ability, and gives a practical measure of the computational skills. The correlation between scores on the Hundred Problem Test Form V and the Terman-McNemar Test of Mental Ability Form C was .43 for 278 pupils in grade X, while the correlation of the Hundred Problem Arithmetic Test and the Foust-Schorling Test of Functional Thinking in Mathematics was .53 for grade X pupils in the national standardization population. Reliability coefficients of .94 and .95 were established by the Kuder-

[3]Garrett, op. cit., pp. 38-53.
[4]Garrett, op. cit., pp. 187-189.

Richardson formula,[5] which indicate that a high degree of consistency may be expected in measuring arithmetical skills.

The Intermediate California Arithmetic Test is suitable for grades VII, VIII, and IX. Because of the wide range of ability found in most grades, this test provides for measurement several grades above and below the particular grade being tested. The California Arithmetic Test is one of a group of three tests which comprise the Intermediate Battery of the California Achievement Test series. The Arithmetic Test may be used alone, or in conjunction with the corresponding forms of the Reading and Language Test when a more comprehensive coverage of basic skills is desired. All levels and forms of the California Test series possess a high degree of validity. The coefficients of reliability are given for the two main parts of the test and for the total. The reliability for Arithmetic Reasoning is .92 with a standard error of measurement of .41. For Arithmetic Fundamentals the reliability coefficient is .95 with a standard error of measurement .33. The reliability for the total test is .95 with a standard error of .32. These coefficients were determined by averaging the intercorrelations of the different forms of the test for a single grade range.

The total working time of seventy-four minutes may be broken conveniently into two sessions. The Examiner's Manual[6] gives clear and adequate directions for the administration of the test. The test may be hand or machine scored. Reviewers of the test stated that it is a good instrument for surveying performance in fundamental operation but discount the diagnostic features of the test. For example:

> The California Arithmetic Test, with four carefully equated forms at each of three levels, provides a good instrument for surveying performance in fundamental operations, problem solving, and certain aspects of information. The tests are easily administered and scored, and the comparison of individual scores with norms can be done in a minimum of time. The diagnostic features of the test are not so valuable as they seem, but they have some value for teachers aware of diagnostic limitations of tests that survey widely.[7]

Related Studies

A search of educational literature reveals many shortcomings of the arithmetic program. Clemens and Neubrauer[8] studied difficulties in multiplication encountered by 2,000 children in grades IV to VIII, finding that all possible types of errors were made.

5C. F. Kuder and M. W. Richardson, "The Theory of the Estimation of Test Reliability," **Psychometrika** 2:3 (September, 1937), pp. 151-160.

6E. W. Tiegs and W. W. Clarke, **Manual California Arithmetic Test.**

7O. K. Buros, (ed.), **The Fourth Mental Measurements Yearbook,** p. 411.

8R. B. Clemens and P. E. Neubrauer, "A Supervision Project in Multiplication," **Journal Educational Research** 18, pp. 387-96.

In 1943 Arthur[9] prepared a test to see which requirements advanced by the committee on Essential Mathematics for Minimum Army Needs required further attention in high school. He found that freshmen entering high school three or four years after the publication of the report did not have adequate understanding of or the ability to work many of the problems considered essential. Much specifity in learning was revealed by the test. Important difficulties with decimals and per cent were found. Arthur concluded that remedial teaching at the high school level is necessary to meet the essential needs listed by the committee. Sueltz and Benedick[10] called attention to the fact that the capacity to use arithmetic functionally means more than ability to compute. They constructed tests to measure understandings and judgments as well as computation and problem solving. The results from 2,000 grade VI students in three eastern states revealed glaring weaknesses in all areas measured: understandings, judgments, computation, and problem solving. The tests were repeated in grade IX and in the senior high school with approximately the same conclusions. The authors found that competence in functional arithmetic falls once the grade VI level has been passed. Furthermore, the program of mathematics at the junior and senior high school level was not adequate to overcome the shortcomings and deficiencies revealed by the tests in grade VI.

R. O. Pritchard,[11] in his province-wide survey of arithmetical achievement in grade V, found that while the Alberta medians did not differ from the Iowa medians, the medians of the Alberta rural ungraded school sample were significantly inferior to those of the Iowa standardization sample in all sections of the test. C. E. Climenhaga,[12] in his survey of arithmetical achievement of grade VIII pupils in Alberta, found that the town and urban children compared favorably in most areas tested with the standardization group of the Iowa Every Pupil Test of Basic Arithmetical Skills, but the poor attainment of the ungraded rural pupils persisted at this level.

These investigations reveal many shortcomings of pupils' achievement. Glaring weaknesses in the four fundamental operations are common in the intermediate, junior high, and senior high schools. Important difficulties with decimals and per cent are found. Pupils are very deficient in ability to perceive and apply such relationships as those involved in direct and inverse proportion. To eliminate

---

9L. A. Arthur, "Diagnosis of Desirabilities in Arithmetic Essentials," **The Mathematics Teacher 43** (May, 1950), pp. 197-202.

10B. A. Sueltz and W. Benedick, "The Need for Extending Arithmetic Learnings," **The Mathematics Teacher 43** (February, 1950), pp. 67-73.

11R. O. Pritchard, **A Survery of the Arithmetical Achievement of Grade Five Pupils in Alberta Schools.**

12C. E. Climenhaga, **A Survey of Arithmetical Achievement of Grade Eight Pupils in Alberta Schools.**

those shortcomings remedial teaching is necessary at the high school level. It is also recommended that more attention be given to the study of fractions and ratios.

The Hundred Problem Arithmetic Test Data

1. Achievement in Addition

There were ten items in addition of various types in this section. The mean achievement of the various grades is given in Table I, below.

TABLE I

MEAN SCORES FOR GRADE VII, VIII, AND IX ON PART I, ADDITION, HUNDRED PROBLEM ARITHMETIC TEST

Sample	Mean	Standard Deviation	Standard Error of Mean
Grade Seven	7.86	2.79	.220
Grade Eight	8.43	1.49	.116
Grade Nine	8.59	1.33	.110

Grade IX obtained the highest mean score, followed by grade VIII, and then grade VII. The reverse order prevailed in the standard deviations. When the differences between the means of three samples were tested for significance against Fisher's table of *t*, highly significant differences were found. The critical ratio of the difference between grade VII and VIII is significant at the .05 level, while the critical ratio between grade VII and IX is highly significant at the .01 level. There is no significant difference in achievement in addition between grades VIII and IX.

2. Achievement in Subtraction

The items in this section of the test are too easy for the better students in all of the grades. The distribution curves are negatively skewed, indicating a piling up of scores at the top. When the differences between the means were compared for significance, results similar to those for addition were found.

3. Achievement in Multiplication

The grade IX group obtained a slightly higher mean score than grade VIII which was followed by grade VII. The greatest variability of scores from the mean is in the grade VII sample, with the least variation existing in grade VIII. The achievement of both grade VIII and IX is superior to that of grade VII. There

is no significant difference between the achievement of grade VIII and grade IX.

4. Achievement in Division

There is a significant difference between the achievement of grade VII and grade VIII at the .01 level of confidence. There is a similar difference between the achievement of grade VII and IX. There is no significant difference between the achievement of grade VIII and IX.

5. Achievement in Fractions, Decimals, and Per cent

This section of the test is doing a better job of measuring achievement in grade VII and in grade VIII than did the other sections. The distribution curves are near normal for all the grades tested, although no significant difference between the achievement of grade VIII and IX is apparent. The achievement of both grade VIII and IX is superior to that of grade VII.

On the total test significant differences between the achievement of grades VII and VIII is revealed, but there is no significant difference between that of grade VIII and IX. A possible reason for this might be that more attention is given in the grade VIII arithmetic program to problems dealing with fundamental operations and fractions, decimals and per cent that is given in the grade IX program. Furthermore, time may have permitted the grade IX's to lose some of their ability through disuse. Still another explanation might be that the test does not discriminate effectively at this level.

California Arithmetic Test Data

The California Arithmetic Test, Form AA, is divided into two parts: Arithmetic Reasoning and Arithmetic Fundamentals. The Arithmetic Reasoning part is made up of four subsections, while the Arithmetic Fundamentals part is also made up of the same number of subsections.

1. Numbers Concepts

This section is composed of fifteen items. The problems deal with recognizing numbers, Roman numerals, and selecting the largest number in a group of numbers. The grade IX achieved the highest mean score, followed by grade VII and then the grade VIII. When the mean differences were tested for significance it was found that there was no difference between the achievement of grade VII, VIII, and IX in this section.

2. Symbols and Rules

This section contains fifteen items that test the understanding of the common symbols and rules used in arithmetic. The rank

order of mean scores was as follows: grade IX, grade VIII, and grade VII. The grade VIII group had the highest standard deviation. Highly significant critical ratios were obtained when the mean differences were tested for significance. This leads to the following conclusions: (1) there is a significant difference between the achievement of grade VII and grade VIII; (2) there are similar significant differences between the achievement of grade VII and grade IX and grade VIII and grade IX; (3) grade IX has the greatest mastery of the use of symbols and rules, followed by grade VIII and then grade VII. This indicates that there is growth in the ability of grade VII, grade VIII, and grade IX students in the use of symbols and rules. Theoretically this is as it should be.

3. Numbers and Equations

This section contains ten items. The first five problems deal with the operations of addition, substraction, multiplication, and division of signed numbers. The next five problems deal with the solution of equations. Grade IX had the highest mean score followed by that of grade VIII and grade VII. When tests for the significance of difference between the means were carried out it was found that significant differences existed between grade VII and grade VIII, and grade VIII and grade IX.

4. Problems

This section is composed of fifteen common type problems dealing with the finding of area, volume, averages, per cent, interest, profits, and premiums. The rank order of the samples as determined by the means is grade IX, VIII, and VII. This is the same as in sections 2 and 3. This similarity indicates that the ability in symbols and rules, numbers and equations, and problems increases with age and grade. This again is further evidence that the California test is measuring better than did the Hundred Problem test. In the section of the Hundred Problem test that corresponds to this one, the rank order of means was VIII, IX, and VII. The California Test results indicate growth in problem solving ability from grade VII to grade VIII, and from grade VIII to grade IX. Since there is a theoretical basis for the correlation of arithmetical scores with age and progress through school it must be assumed that the California test is doing a better job of measuring than did the Hundred Problem.

5. Arithmetic Reasoning, Total Part I

Arithmetic Reasoning forms Part One of the test and consists of 55 problems. These problems have been divided into four subsections: Number Concepts, Symbols and Rules, Numbers and Equations, and problems which have been dealt with above. When

the achievements of the various grades were compared for significance, critical ratios of such size resulted that they were significant at the .01 level. This leads to acceptence of the conclusion that the differences in mean arithmetic reasoning scores are real differences and could rarely occur as a result of accident or sampling. The achievement of the grade IX in Arithmetic Reasoning is significantly superior to that of grade VIII, and the achievement of grade VIII is significantly superior to that of grade VII. Such differences are normally expected with continued good instruction and increase in age.

6. Arithmetic Fundamentals, Part II

This section of the test is divided into four subsections: addition, subtraction, multiplication, and division. There were twenty items in each subsection with a total of eighty problems.

7. Addition

The section on addition is composed of problems in column addition, adding money, adding fractions, adding mixed numbers, and adding different units of measurements. The rank order of the samples according to mean scores was grade IX, VIII, and VII. All mean differences between the grades are significant.

8. Subtraction

This section on subtraction deals with problems of subtracting two, three, and four digit numbers, fractions of like and related denominators, mixed numbers, decimal numbers and time units. The grade IX sample has the highest mean score followed by grade VIII and then grade VII. Significant differences exist between the mean scores of grade VII and VIII, and between grade VIII and IX.

9. Multiplication

This section on multiplication tests the essential skills required in multiplication of integers, fractions, and decimals. Grade IX has the highest mean score followed by grade VIII, and grade VII. The mean differences between grade VII, VIII, and IX are highly significant, indicating growth in the ability to handle the mathematical operation of multiplication in each grade, from grade VII to grade VIII, and from grade VIII to grade IX. These results are verified by the Hundred Problem Test for grade VII and grade VIII, but the Hundred Problem Test shows no difference in achievement between grade VIII and IX.

10. Division

This section tests fundamental abilities required in division. There are problems dealing with the division of fractions by

mixed numbers, and division employing decimal divisors. The grade IX achievement is significantly superior to that of grade VIII and that of grade VIII is significantly superior to that of grade VII.

11. Arithmetic Fundamentals, Total Part II

Grade IX obtained the highest mean score followed by grade VIII and then grade VII. This is similar to the rank order of the means of the various subsections, indicating the steady growth of arithmetical ability in the fundamental processes between the grades.

12. Total Test

The examination of the total California Test data leads to the following conclusions. (1) On the total test grade IX achievement is significantly superior to that of grade VIII and grade VII. (2) The achievement of grade VIII is significantly superior to that of grade VII. The findings of the California Test data makes it reasonable to assume that there is continuous growth in arithmetical attainment through the three grade levels of the junior high schools of Lethbridge. The Hundred Problem data is in agreement with this conclusion for grade VII and grade VIII, but not as far as the grade IX is concerned. This again shows the failure of the Hundred Problem Test to detect a significant difference between grade VIII and IX, a difference which is repeatedly confirmed by the California test. (3) In sections of the California Test that deal with symbols and rules, numbers and equations, and problem solving, the achievement of grade IX is significantly superior to that of grade VII or grade VIII. (4) The California Test reveals significant differences between the achievement of grades VII, VIII, and IX. The Hundred Problem Test indicates differences between grade VII and VIII, but fails to demonstrate the existence of differences between grade VIII and IX.

Comparison of Achievement

1. The Comparison of Lethbridge Achievement with The Hundred Problem Norms

As no means, standard deviations, or grade scores are given for the Hundred Problem standardization sample it is necessary to use a single measure which represents the distribution of scores for the entire group. The standing of the Lethbridge sample in relation to the performance of the national standardization population may be determined by finding the percentile rank corresponding to the median score for the Alberta group.[13] The final grade percentile norms are given in the Manual of Directions, Hundred Problem Arithmetic Test.

[13]R. Schorling, J. R. Clark, and M. A. Potter, **Manual of Directions, Hundred Problem Arithmetic Test, p. 4.**

TABLE II

MEDIAN AND PERCENTILE SCORES FOR LETHBRIDGE AND HUNDRED PROBLEM SAMPLES, HUNDRED PROBLEM ARITHMETIC TEST

Grade	Lethbridge Median	Percentile Rank	Hundred Problem Median	Deviation*
Seven	69.06	76	53.4	15.66
Eight	78.51	81	61.3	17.21
Nine	79.35	71	68.8	10.55

*The difference between sample median and standardization median.

Table II reveals that grade VIII had a percentile ranking of 81, grade VII 76, and grade IX 71. The table also indicates relatively high deviations of the Alberta samples from the norms. For a class of more than twenty-five a deviation of more than three raw score points from the national standardization median may be considered significant.[14] It is now reasonable to conclude that the achievement of grades VII, VIII, and IX in the Lethbridge junior high schools is significantly better than that of the Hundred Problem standardization sample. The diminishing percentile rank for grade IX as compared with that of grade VIII may be explained, perhaps, in terms of the instructional program in that grade, or of the ineffectiveness of the measuring instrument in bringing out differences in achievement between grade VIII and IX. Since the California Test reveals significant differences the obvious conclusion is that the Hundred Problem Test diminishes in effectiveness at the grade IX level.

2. Lethbridge Results Compared with California Norms

The norms of the California Arithmetic Test have been based on a huge sample which constituted a normal distribution of mental ability, typical age-grade relationships, and other characteristics.[15] These characteristics must be assumed for the samples from the Lethbridge schools if the comparison is to have validity. The test makers use grade-placement and percentile norms. Therefore it is necessary to make a comparison of the achievement of the Lethbridge samples on these bases. The norms are given for arithmetic reasoning, arithmetic fundamentals, and for the total test. The achievement of grades VII, VIII and IX appear in Table III.

[14] Ibid., p. 4.

[15] E. W. Tiegs and W. W. Clark, Manual for California Arithmetic Test, 1950, p. 17.

TABLE III

MEAN, GRADE PLACEMENT AND PERCENTILE RANKING OF GRADE VII, VIII, AND IX IN ARITHMETIC FUNDAMENTALS AND TOTAL ACHIEVEMENT, CALIFORNIA ARITHMETIC TEST

Sample	Mean	Possible Score	Grade Placement	Percentile Rank
Grade Seven				
Arithmetic Reasoning	31.66	55	8.6	75
Arithmetic Fundamentals	61.71	80	8.6	75
Total Test	93.48	135	8.6	75
Grade Eight				
Arithmetic Reasoning	38.68	55	9.5	75
Arithmetic Fundamentals	65.84	80	9.2	60
Total Test	104.70	135	9.4	70
Grade Nine				
Arithmetic Reasoning	45.63	55	10.5	75
Arithmetic Fundamentals	68.70	80	9.6	50
Total Test	114.50	135	10.1	60

Table III reveals that grade VII has a grade placement of 8.6 and a percentile rank of 75. As the tests were administered toward the end of January this gives grade VII a placement of 1.1 grades above their actual position. It is interesting to note that the grade placement and percentile rank of grade VII were the same on the two parts, arithmetic reasoning and arithmetic fundamentals, and on the total test. The grade VIII group placed one grade above their level in arithmetic reasoning, .7 of a grade above their own grade in arithmetic fundamentals and .9 of a grade above their own on the total test. Their percentile rank was 75 on arithmetic reasoning, 60 on arithmetic fundamentals and 70 on the total test. Grade IX was 1.0 grades above the California sample in arithmetic reasoning, .1 of a grade above in arithmetic fundamentals and .6 above the norms on the total test. This suggests a relative weakness in the ordinary process involved in arithmetic fundamentals.

In answering the question implied at the beginning of this article, it is reasonable to say that the pupils of the Lethbridge schools in grades VII, VIII, and IX are doing significantly superior work in comparison with the standardization sample of the California test. Although their superiority in fundamental processes is less than in other areas, this superiority is generally confirmed by the comparison of the Lethbridge group with the standardization sample of the Hundred Problem Test.

Areas of Strength and Weakness in Achievement in Arithmetic

The areas of strength and weakness as revealed by the Hundred Problem Arithmetic Test will be considered first. As the test makers have not supplied norms for any of the subsections, there is no reliable standard with which to compare sub-scores in order to determine just how good they are. Therefore it is necessary to rely on a comparison of mean achievement with possible achievement.

TABLE IV

MEAN ACHIEVEMENT OF GRADE VII, VIII, AND IX ON SUBSECTIONS AND TOTAL, HUNDRED PROBLEM ARITHMETIC TEST

Parts	Mean Scores Grade Seven	Mean Scores Grade Eight	Mean Scores Grade Nine	Possible Scores
I. Addition	7.9	8.4	8.6	10
II. Subtraction	8.5	9.0	9.0	10
III. Multiplication	11.4	12.5	12.8	15
IV. Division	10.5	12.0	12.5	15
V. Fractions, Decimals and Per Cent	29.5	35.0	34.5	50
VI. Totals	67.6	76.8	77.1	100

In addition, out of a possible score of 10 the grade VII class achieved a mean score of 7.9, the grade VIII group had a mean score of 8.4,and the grade IX a mean score of 8.6. If these scores were converted to percentages they would be 78.56 per cent, 84.27 per cent, and 85.9 per cent. This means that the achievement of half the grade VII class is above 78.56 per cent, half the grade VIII class is above 84.27, and half the grade IX sample is above 85.9 per cent. It is reasonable to conclude that addition is an area of strength. The mean scores for subtraction are high also. Grade VII has a

mean score of 8.5, grade VIII 9.0, and grade IX 9.0. There were 31.25 per cent of the grade VII sample that made perfect scores in this section, while 40.49 per cent of the grade VIII and 44.44 per cent of the grade IX scored 10 out of 10. From this evidence it is reasonable to conclude that subtraction is also an area of strength, and that the test did not measure top students adequately.

The mean scores in multiplication are as follows: grade VII 11.4, grade VIII 12.5, and grade IX 12.5. As these scores are out of a possible 15 multiplication may be regarded as an area of strength. The mean scores for division are very close to those of multiplication, and division may be regarded as a strong area.

TABLE V

MEAN ACHIEVEMENT OF GRADE VII, VIII, AND IX CALIFORNIA ARITHMETIC TEST

Parts	Grade Seven Mean Scores	Grade Eight Mean Scores	Grade Nine Mean Scores	Possible Score
A. Number Concepts	12.0	11.8	12.2	15
B. Symbols and Rules	7.8	10.3	13.2	15
C. Numbers and Equations	4.4	5.9	8.2	15
D. Problems	7.4	10.6	12.1	15
Total Arithmetic Reasoning	31.6	38.7	45.6	55
E. Addition	15.5	16.3	17.1	20
F. Subtraction	16.1	16.9	17.7	20
G. Multiplication	14.7	16.3	17.1	20
H. Division	15.2	16.7	17.4	20
Total Arithmetic Fundamentals	61.7	65.8	68.7	80
Total Arithmetic	93.5	104.7	114.6	135

On the subsection dealing with decimals, fractions and per cent, the mean scores were lower. It may be assumed that the achievement of all samples in this area is relatively weaker, and that the test performed its task of measuring in an adequate manner. On all parts of the tests the achievements of grade VII, VIII, and IX are similar. When the scores were high for grade VII they were high for grade VIII and IX. When the scores were low for grade VII they were low for grade VIII and IX. The high scores were

obtained in the subsections dealing with addition, subtraction, multiplication and division, while the lowest scores were obtained on the section dealing with decimals, fractions, and per cent.

As the test makers do not give norms for any of the subsections of the California Arithmetic Test it will again be necessary to compare mean achievement with possible achievement.

The grade VII group has a higher mean score for arithmetic fundamentals than it has for arithmetic reasoning. Areas of strength appear in addition, subtraction, division, and in number concepts. This is to be expected as the grade VII pupils have had most of their arithmetical experience in these areas. Weakness appears in multiplication, symbols and rules, numbers and equations, and problems. The grade VIII group shows strength in all the fundamental operations: addition, subtraction, multiplication, division and number concepts. Weaknesses appear in symbols and rules, numbers and equations, and problems. The grade IX obtained high scores in all sections.

Conclusions

1. The Hundred Problem Arithmetic Test results revealed that the achievement of all grades in addition, subtraction, and multiplication was more favorable than it was in division, decimals, fractions and per cent. The test showed no significant difference between the achievement of grades VIII and IX. The achievement of all grades was significantly superior to that of the Hundred Problem standardization samples.

2. The California Test findings revealed growth in arithmetical competence from grade VII to grade VIII, and from grade VIII to grade IX. Although the pupils of the Lethbridge schools in grade VII, VIII, and IX are doing significantly superior work in comparison with the California standardization sample, it is indicated that their superiority in fundamental processes is less than in other areas.

3. The Hundred Problem Arithmetic Test fails to discriminate between the achievement of grades VIII and IX, and in many cases fails to measure the full competence of the excellent students. The California Test is doing a much better job of measuring, and can be recommended for use in our schools.

BIBLIOGRAPHY

Alberta Department of Education. *Junior High School Curriculum Guide for Mathematics.* Edmonton, Queen's Printer, 1952.

Anastasi, A. *Psychological Testing.* New York, MacMillan Company, 1954.

Arthur, L. E. "Diagnosis of Desirabilities in Arithmetic Essentials." *Mathematics Teacher* 43 (May, 1950), pp. 197-202.

Brueckner, L. J. "Educational Diagnosis." *Thirty-fourth Yearbook National Society for the Study of Education.* Bloomington, Ill., Public School Publication Co., 1935.

Brueckner, L. J. *Diagnostic and Remedial Teaching in Arithmetic.* Philadelphia, John C. Winston Company, 1930.

Brueckner, L. J. and Grossnickle, F. E. *Making Arithmetic Meaningful.* Philadelphia, John C. Winston Company, 1953.

Buros, O. K. (ed.). *The Fourth Mental Measurements Yearbook.* London, Gryphon Books Ltd., 1953.

Buros, O. K. (ed.) *The Nineteen Forty Mental Measurements Yearbook.* New Brunswick, Rutgers University Press, 1940.

Buswell, G. T. *Diagnostic Studies in Arithmetic.* Chicago, University of Chicago Press, 1926.

Clements, R. B. and Neubauer, P. F. "A Supervision Project in Multiplication." *Journal of Educational Research* 18 (1928), pp. 387-96.

Fisher, R. A. and Yates, F. *Statistical Tables.* New York, Hafner Publishing Company, 1948.

Garrett, H. E. *Statistics in Psychology and Education.* New York, Longmans, Green and Company, 1953.

Glennon, V. J. "Testing Meanings in Arithmetic." *Arithmetic, 1949.* Supplementary Educational Monographs, No. 70, Chicago, University of Chicago Press, 1949.

Grossnickle, F. E. and Snyder, J. H. "Constancy of Errors to Basic Facts in the Fundamental Operation in Arithmetic." *Journal Educational Research* (1938-39), pp. 336-44.

Harvey, J. E. *The Growth of Mathematical Abilities in Grades Seven to Eleven of the Secondary School.* Unpublished Master Thesis, University of Alberta, 1936.

Jordan, A. M. *Measurements in Mathematics.* New York, McGraw Hill Book Company, Inc., 1953.

Montgomery, J. F. *An Investigation of Case II Relationships in Arithmetic.* Unpublished Doctoral Thesis, Durham. N. C. Duke University, 1950.

Morton, R. L. "An Analysis of Pupils' Errors in Fractions." *Journal Educational Research* 9 (1934), pp. 117-25.

Remmers, H. H. and Gage, N. L. *Educational Measurement and Evaluation.* New York, Harper and Brothers, 1943.

Schorling, R., Clark, J. R. and Potter, M. A. *Manual of Directions, Hundred Problem Arithmetic Test.* Yonkers-on-Hudson, World Book Company, 1944.

Sueltz, B. A. and Benedick, J. W. "The Need for Extending Arithmetic Learnings." *Mathematics Teacher* 43 (February, 1950), pp. 69-73.

Swift, W. H. *An Investigation of Abilities of Grade 4, 5, and 6, Pupils in Solving and Analysing Problems in Arithmetic.* Unpublished B.Ed. Thesis, University of Alberta, 1930.

Tiegs, E. W. and Clarke, W. W. *Manual California Arithmetic Test.* Los Angeles, California Test Bureau, 1950.

Van Engen, L. G. "Measuring Arithmetic Achievement." *Mathematics Teacher* 37 (May, 1944), pp. 217-18.

Wheat, H. G. *Psychology and Teaching Arithmetic.* New York, D. C. Heath and Company, 1937.

Wilson, G. M. "Arithmetic." *Encyclopedia of Educational Research,* 1950.

The Alberta Journal of Educational Research

Vol. II

1956

THE COMMITTEE ON EDUCATIONAL RESEARCH

Faculty of Education
University of Alberta

Editorial

RESEARCH AND PHILOSOPHIC INQUIRY

Research is clearly limited by a number of factors: availability of subjects and data, measurability, control. As a result there has been some tendency to distinguish it rigidly from philosophic inquiry. There has been a further tendency to affirm that research is less important than philosophy because it can answer only questions of fact, not of value.

These are unfortunate tendencies. While the central distinction between research and philosophy may be valid enough, it by no means follows that the two must proceed in complete isolation. Research is normally undertaken for the express purpose of providing answers to questions of value, or at least of feasibility. Even if it is not so undertaken, the results of research frequently provoke and assist with answers to questions of value. To require that the objective investigator close his mind to matters of value, or that the deductive thinker dissociate himself from problems of research design and planning would be to push aside needlessly the possibility of broader and better articulated understandings. Surely it is arrogant for the philosopher to say: find me the facts, and I'll tell you what they mean. And just as surely there has been a disposition on the part of some philosophers to adjust the facts to some preconceived scheme of values.

One might almost hope to defend the proposition that those thinkers who have made the greatest contribution have indeed been those whose interests and competence have bridged the two fields.

There is, of course, an historical explanation for the claim that objective research is less important than philosophic inquiry. All science was at one time regarded merely as a branch of philosophy. The rest of the record would seem to show that science began to make its true contribution only when it was emancipated from a position of subservience. And too many of the questions that philosophers still try to answer appear to be answerable, if at all, by objective study and research rather than by sheer ratiocination.

The view here proposed is that of research as an equal partner in the disciplined study of educational problems.

A QUALITATIVE ANALYSIS OF READING ACHIEVEMENT IN EDMONTON SCHOOLS

CAMPBELL YOUNG
Principal, Virginia Park School
Edmonton, Alberta

The Problem

Since reading is probably the most important skill to engage the attention of the school beginner, the progress of pupils in this subject must be under constant examination. Within a few weeks after instruction begins, individual differences in reading become apparent. As the children progress through the grades, differences tend to increase to a startling degree. Wrightstone[1] found a spread of at least five grades in reading ability of 6,581 grade III pupils in New York City. In a similar study of 11,178 grade VIIA pupils, he[2] found an even greater dispersion in reading grade scores, ranging from below grade V to better than grade XII.

Testing of achievement to permit early detection of superiority or weakness in reading is extremely important. Periodically the teacher may make an informal evaluation to check the progress of the class and its individual members. For a more precise measure standardized survey tests and diagnostic tests will serve the purpose better. With this information the teacher may plan more effectively to provide for the needs of both class and individual.

The present investigation is related to Carmichael's[3] study of reading achievement in Alberta. The primary aim of the present study is the analysis of the strengths and weaknesses in reading of 192 grade IV students, and 196 grade VII students, randomly chosen from the Edmonton school system. Attention will be focused on the scores made in reading vocabulary, reading comprehension, their seven component parts, and, to a certain extent, the sub-component elements. The testing instruments were the California Reading Test, Elementary Form AA, and the California Reading Test, Intermediate Form AA. A secondary aim of the investigation is an assessment of the value of the tests.

Experimental Design and Testing Instruments

A survey of reading and language achievement in Alberta schools was conducted in May, 1953. One thousand pupils from each of

1J. W. Wrightstone, **Educational Psychology**, p. 485.
2Ibid., p. 486.
3A. Carmichael, **A Survery of the Achievement of Alberta School Children in Reading**, p. 1.

grades IV and VII were included. Two hundred pupils from each grade were randomly selected from each of the five organizational units: large urban, small urban, town, graded rural, and ungraded rural.

Edmonton was selected to provide the large urban sample. Sufficient classes of grade IV and grade VII pupils to fill the required sample were drawn according to a table of random numbers.[4] All pupils in each class drawn were tested. Surplus answer sheets were withdrawn randomly before the tests were scored. With these precautions it was hoped to satisfy the criterion of randomness.

This study will concern itself with the large urban sample drawn from the Edmonton school system.

In the California test, reading vocabulary and reading comprehension are the main fields tested. These are divided and subdivided into component and sub-component parts. The results obtained for each sub-component of the tests were taken from the summary of scores and the Diagnostic Analysis of Learning Difficulties on the last page of the California Reading Test booklet for each grade IV and grade VII student. This information was utilized to study the two main problems set forth for this investigation: reading strengths and weaknesses of Edmonton children and the value of the California Reading Tests.

The methods described will refer to the grade VII sample. However, the organization and analysis of the grade IV results followed, in essence, the same plan.

Mean achievement of the grade VII sample was calculated for the total test, the two main sections, and the components. These mean scores were compared with the California Reading Test norms for grade placement 7.9. By means of a straight line drawn vertically on the diagnostic profile at grade placement 7.9, the norms for the seven components were estimated and compared with the sample's mean component scores. Further analysis of the sample's scores for the main sections and components of the test provided additional data, such as number of perfect scores, range of scores, and median scores.

The percentages of correct responses attained by the sample were calculated in the fifteen components and sub-components of the Diagnostic Analysis of Learning Difficulties. A naive analysis of the results was made.

A study was made of the goodness of the tests in the light of the data secured from the Edmonton samples. The distributions of

[4]E. F. Lindquist, **Statistical Analysis in Educational Research**, p. 119-120.

scores in Vocabulary and Comprehension and the seven components of the diagnostic profile were tested for skewness.

Bloom has named the essential reading skills.

> These skills are speed of reading; knowledge of word meaning, or vocabulary skill; reading for total meaning; reading for central thought; reading for comprehension of special factual information; the ability to read and comprehend and to organize the material that is read; and the ability to read and comprehend and to follow precise directions.[5]

The California Reading Tests would seem to measure reasonably adequately these basic skills.

While some criticism is offered by reading test experts, most of them would seem to agree with Flanagan that teachers will find the California Reading Test "a valuable tool in appraising the progress of pupils with respect to these important skills of vocabulary and reading comprehension."[6]

In her evaluation of the California Test Battery Anastasi makes the following criticism of the Diagnostic Analysis of Reading Difficulties.

> Although of possible help in suggesting specific weaknesses in the individual's mastery of a skill, such an analysis may be quite misleading because of the small number of items involved. The reliabilities of the five major tests at each level appear to be adequate for survey purposes. No reliabilities are reported, however, for the subtests, some of which are very short. As for the functional elements, it is apparent that chance errors of measurement may play a considerable part in the results obtained in individual cases.[7]

The opinions of various reading experts would lead us to conclude that the California Reading Test does measure the fundamental reading skills adequately and reliably. The diagnostic features should prove of use in assaying class achievement. Individual subscores must be regarded as only suggestive.

Related Studies

Competence in the complex skill of reading is so important that teachers are anxious to promote its steady growth in their students. Russell[8] believes that evaluation is one of the most effective ways of preventing crystallization or deterioration of an instructional programme.

Tiegs[9] compared the reading scores of approximately 230,000 elementary pupils in seven states of the Stanford and Progressive

---

[5] **M. E. Bloom et al., Effective Reading Instruction,** p. 246.

[6] **J. C. Flanagan, Fourth Mental Measurement Yearbook,** p. 568.

[7] **A. Anastasi, Psychological Testing,** p. 469.

[8] D. H. Russell, "Evaluation of Pupil Growth In and Through Reading", **N.S.S.E. Forty-Eighth Yearbook, Part 11, 1949,** p. 285.

[9] **E. W. Tiegs, Progressive Education** (January, 1952), p. 106.

Achievement Tests before and after 1945. The scores indicated a slight gain in the achievement-level of pupils despite the fact that more children who formerly failed and dropped out were remaining in school, and the average chronological age was decreasing.

In a recent study, Coull[10] found that Alberta children in grades IV and VII were respectively superior and equal in reading achievement to the norms of the California Reading Tests, Form AA, in terms of grade scores. He also found an indication of deceleration in growth of reading ability between grades IV and VII.

Strengths and Weaknesses in The Reading of Edmonton Children

Grade IV data

One of the main purposes of this study was to secure accurate, objective and unbiased information about the reading performance of the Edmonton sample as measured by the California Reading Tests. Tables I to IV will present findings with respect to grade IV. Tables V to VIII will provide similar information about grade VIII.

Table I compared mean achievement of the grade IV sample with the norms of the California Test for Vocabulary, Comprehension, and Total Reading. It is to be noted that the Edmonton data were secured in the ninth month in grade IV. As a result, achievement will be compared with the test norms provided for grade 4.9.[11]

TABLE I

COMPARISON OF MEAN RAW SCORES FOR GRADE FOUR IN VOCABULARY, COMPREHENSION, AND TOTAL READING WITH CALIFORNIA READING TEST NORMS FOR GRADE PLACEMENT 4.9

Reading Skills	Mean of Edmonton Raw Scores	California Raw Score Norms	Difference
Vocabulary	70.48	66	4.48
Comprehension	26.25	21	5.25
Total Reading	96.73	87	9.73

The comparison in Table I indicates that the grade IV sample exceeded the norms in Vocabulary, Comprehension, and Total Reading.

10W. H. Coull, **A Normative Survey of Reading Achievement of Alberta Children in Relation to Intelligence, Sex, Bilingualism and Grade Placement**, p. 57.

11Ernest W. Tiegs and Willis W. Clark, **Manual, California Reading Test—Elementary**, p. 20.

Table II draws a comparison of the means of the raw scores obtained by the grade IV sample in the seven components of the California Reading Test with the estimated norms for these components. The estimates were secured by drawing a vertical line through grade placement 4.9 on the diagnostic profile on the last page of the test booklet.

TABLE II

COMPARISON OF MEAN RAW SCORES IN THE SEVEN COMPONENTS FOR GRADE FOUR WITH THE NORMS ESTIMATED FROM THE DIAGNOSTIC PROFILE AT GRADE PLACEMENT 4.9

Reading Skills	Means of Edmonton Raw Scores	Estimated California Norms	Differences
Vocabulary			
Word Form	23.66	23.20	.46
Word Recognition	18.96	17.60	1.36
Opposites	13.99	12.60	1.39
Similarities	13.91	11.50	2.41
Comprehension			
Following Directions	7.18	5.90	1.28
Reference Skills	6.46	5.50	.96
Interpretations	12.61	9.00	3.61

The mean scores of the Edmonton sample exceeded the estimated California norms in all seven components; the superiority in Interpretations being particularly striking. From this greatest display of superiority the difference of mean raw scores ranged downward to .46 in Word Form, the smallest difference noted.

Table III presents more data concerning scores obtained by the grade IV sample in the two major sections and the seven components of the test.

A wide range in ability in the reading skills is clearly indicated. Reading grade placement levels in the seven components, estimated from the diagnostic profile, vary from below 2.0 to above 9.0. The median scores are in every case higher than the mean scores obtained by the group for the components shown in Table II. The fact that the groups' mean and median scores exceeded the California component norms seems to indicate that the sample found the test relatively easy.

Perfect scores in three of the component were comparatively numerous. Of the 192 pupils in the sample, perfect scores were made by 76 pupils in Word Form, by 106 in Word Recognition, and

by 19 in Following Directions. It would appear that the tests are inadequate in that they fail to differentiate the ability levels of the many pupils attaining perfect scores.

TABLE III

SCORES OBTAINED BY THE GRADE FOUR SAMPLE FOR THE MAJOR SECTIONS AND THE SEVEN COMPONENTS OF THE DIAGNOSTIC PROFILE

Reading Skills	Possible Score	Number of Perfect Scores N = 192	Range of Scores	Median
Major Sections				
Vocabulary	90	0	33-88	71.00
Comprehension	40	0	10-39	26.17
Components				
Word Form	25	76	11-25	24.20
Word Recognition	20	106	1-20	19.59
Opposites	23	0	0-20	14.26
Similarities	22	1	3-22	14.10
Following Directions	10	19	0-10	7.36
Reference Skills	10	6	1-10	6.55
Interpretations	20	1	3-20	12.62

Table IV shows the percentages of correct responses attained by the grade IV sample from the total possible scores obtainable by the group in the 19 components and sub-components of the Diagnostic Analysis of Learning Difficulties. Ratings are given for 192 pupils.

The percentage of correct responses scored by the sample in the components and sub-components of the diagnostic analysis show, in a general way, the elements of the reading skills which are easy for grade IV pupils. However, these scores are merely suggestive for there are only a few test items in each sub-component of the diagnostic analysis. The relatively low percentages of correct responses obtained by the sample in the sub-components, Definitions and Directions, Use of Index, Organization of Topics, and Sequence of Events, might point to weakness in these skills. To improve scores in reading comprehension teachers might be advised to provide more training in these areas. It should be remembered, however, that the position of the two sub-components at the end of the test might account, in part, for the relatively poor scores obtained.

Grade VII data

Table V presents a comparison in Vocabulary, Comprehension, and Total Reading of the means of the raw scores of the grade VII

sample with the California Test norms provided for grade 7.9.[12] It is again to be noted that the Edmonton data were secured in the ninth month of grade VII.

TABLE IV

PERCENTAGE RATINGS OF CORRECT RESPONSES FOR GRADE FOUR STUDENTS FOR THE COMPONENTS AND SUB-COMPONENTS OF THE DIAGNOSTIC ANALYSIS OF LEARNING DIFFICULTIES

Reading Skills		Percentages of Correct Responses
Components	Sub-Components	N = 192
Word Form	Lower Case Words	96.74
	Capitals	95.31
	Miscellaneous Type Faces	88.80
Word Recognition	Gross Differences	98.44
	Initial Sounds or Endings	94.12
Opposites	Basic Vocabulary	60.82
Similarities	Basic Vocabulary	63.26
Following Directions	Simple Directions	78.39
	Direct Simple Choice	77.26
	Definitions and Directions	48.70
Reference Skills	Parts of Book	77.08
	Alphabetizing	59.64
	Table of Contents	72.40
	Use of Index	51.74
Interpretations	Topics or Central Idea	85.16
	Directly Stated Facts	81.86
	Making Inferences	69.90
	Organization of Topics	37.67
	Sequence of Events	34.11

TABLE V

COMPARISON OF MEAN RAW SCORES FOR GRADE SEVEN IN VOCABULARY, COMPREHENSION, AND TOTAL READING TEST NORMS FOR GRADE PLACEMENT 7.9

Reading Skills	Mean of Edmonton Raw Scores	California Raw Score Norms	Difference
Vocabulary	58.78	57	1.78
Comprehension	35.68	35	.68
Total Reading	94.45	92	2.45

12Ernest W. Tiegs and Willis W. Clark, Manual, California Reading Test—Intermediate, p. 16.

Comparison of the achievement of the grade IV and grade VII samples with their respective test norms in Vocabulary, Comprehension, and Total Reading, reveals an apparent decline in the relative superiority of the grade VII pupils.

Table VI makes a comparison of the means of the raw scores obtained by the grade VII sample in the seven components of the California Reading Test with the estimated norms for these components. Following the same method used with grade IV, estimates of normal performance in the ninth month of grade VII were made from the diagnostic profile on the back page of the test booklet.

TABLE VI

COMPARISON OF MEAN RAW SCORES IN THE SEVEN COMPONENTS FOR GRADE SEVEN WITH THE NORMS ESTIMATED FROM THE DIAGNOSTIC PROFILE AT GRADE PLACEMENT 7.9

Reading Skills	Mean of Edmonton Raw Scores	Estimated California Norms	Difference
Vocabulary			
Mathematics	15.80	15.90	— .10
Science	13.53	12.30	1.23
Social Science	15.96	14.80	1.16
General	13.54	13.30	.24
Comprehension			
Following Directions	7.39	6.30	1.09
Reference Skills	9.31	9.20	.11
Interpretations	18.98	17.80	1.18

The Edmonton sample mean scores exceeded the estimated California norms in all components but Mathematics where the sample deficiency was slight. The remaining six components showed relatively small differences in favor of the Edmonton sample, ranging up to 1.23 for Science.

Table VII presents additional data about scores obtained by the grade VII sample in the two major sections and the seven components of the test.

Table VII shows clearly that a wide range of reading ability exists in the grade VII sample. Reading grade placement levels in the seven components, estimated from the diagnostic profile, vary from below 4.0 to above 11.0. The median scores are in every case higher than the mean scores obtained by the group for the seven components. The sample's mean scores were higher than the estimated norms for the test with the previously noted exception,

Mathematics. The slight superiority exhibited by the Edmonton sample, in relation to the estimated norms for the seven components, would seem to indicate that the skills measured were adequately mastered.

TABLE VII

SCORES OBTAINED BY THE GRADE SEVEN SAMPLE FOR THE MAJOR SECTIONS AND THE SEVEN COMPONENTS OF THE DIAGNOSTIC PROFILE

Reading Skills	Possible Score	Number of Perfect Scores N = 196	Range of Scores	Median
Major Sections				
Vocabulary	90	0	15-86	58.92
Comprehension	55	0	11-50	36.02
Components				
Mathematics	22	2	3-22	16.53
Science	23	0	0-21	13.50
Social Science	23	14	0-23	16.39
General	22	1	5-22	13.76
Following Directions	10	34	1-10	7.71
Reference Skills	15	1	0-15	9.50
Interpretations	30	0	7-29	19.00

The sample's mean raw score in Mathematics was 15.80 compared with a estimated norm of 15.90. However, the sample's median score of 16.53 was higher than the norm. This seems to indicate that a majority of the sample earned higher ratings than the norm but a portion of the sample with relatively low scores depressed the mean score below the norm.

In the sample of 196 pupils, perfect scores were made by 14 in the component, Social Science, and by 34 in Following Directions. There seems to be too great a percentage of perfect scores in these components with a resulting failure to differentiate the levels of skill among the more able students. The inability of the test to determine the upper achievement limit of these pupils depressed the mean scores of the group.

Table VIII shows the percentages of correct responses attained by the grade VII sample from the total possible scores obtainable by the group in the 15 components and sub-components of the Diagnostic Analysis of Learning Difficulties. Ratings are given for 196 pupils.

The percentages of correct responses scored by the sample in the components and sub-components of the diagnostic analysis suggest the elements of reading skills which were inadequately mastered.

As with the grade IV results, these findings represent merely possible deficiencies in reading skill. The small number of items in the sub-tests render the reliability of their results open to question. However, the relatively low percentages of correct responses obtained by the sample in the sub-components, Selecting References, Organization of Topics, and Sequence of Events, hint at weakness in these skills. It should be noted that the grade IV sample was weak in Organization of Topics and Sequence of Events. The fact that these two sub-components appear at the end of the test may have some bearing on the low scores obtained in them by the sample.

TABLE VIII

PERCENTAGE RATINGS OF CORRECT RESPONSES FOR GRADE SEVEN STUDENTS FOR THE COMPONENTS AND SUB-COMPONENTS INCLUDED IN THE DIAGNOSTIC ANALYSIS OF LEARNING DIFFICULTIES

Reading Skills		Percentages of Correct Responses
Components	Sub-components	N = 196
Mathematics		71.71
Science		58.81
Social Science		69.41
General		61.53
Following Specific Directions	Simple Choice	76.28
	Definition and Directions	73.28
Reference Skills	Parts of Book	68.78
	Table of Contents	88.27
	Use of Index	83.84
	Selecting References	31.84
Interpretation of Meanings	Topic or Central Idea	73.47
	Directly Stated Facts	71.72
	Inferences	68.80
	Organization of Topics	45.28
	Sequence of Events	38.78

Goodness of the Tests

It seems reasonable to assume that the California Reading Tests are constructed in such a way that, if a large random sample is tested, the frequency distribution of the resulting scores will closely resemble the normal curve. Should there be any significant deviation from normality when a large, randomly chosen sample is tested, it may indicate the existence of defects in the test, undetected selective factors in the sampling, or poor administration of the test and its results.

Carmichael[13] outlined the methods used to obtain a random sample in the provincial survey. Standard procedures were followed. No effort was spared to secure uniformly excellent administration and handling of the tests and their results.

Grade IV sample

Table IX summarizes the results of tests for skewness of the scores for grade IV in Vocabulary and Comprehension and the seven components of the diagnostic profile.

TABLE IX

SKEWNESS OF SCORES OF VOCABULARY AND COMPREHENSION SECTIONS AND THE SEVEN COMPONENTS OF THE DIAGNOSTIC PROFILE OF THE TEST FOR GRADE FOUR

Reading Skills	S.	S.E.	C.R.	Level of Significance
Sections				
Vocabulary	—1.23	.94	—1.31	.....
Comprehension	.22	.54	.41	.....
Components				
Word Form	— .78	.14	—5.57	.01
Word Recognition	— .85	.12	—7.08	.01
Opposites	— .40	.40	—1.0	.....
Similiarities	— .45	.40	—1.13	.....
Following Directions	— .39	.19	—2.05	.05
Reference Skills	— .12	.18	— .67	.....
Interpretations	.30	.33	.91	.....

NOTE: S—Skewness; S.E.—Standard Error of Skewness; C.R.—Critical Ratio.

The measurements of skewness in Vocabulary and Comprehension revealed non-significant departures from normality. However, when the scores for the seven components were examined, evidence of significant skewness in their distributions was apparent in several instances.

The normality of the distritbutions for Vocabulary and Comprehension for the grade IV sample indicates that, on the whole, the Elementary Test, Form AA, meets this requirement.

The distributions of scores for components, Word Form and Word Recognition, were skewed negatively at the .01 per cent level of significance. Asymmetry in these cases may result from the lack of more advanced items in the tests with the result that little dis-

[13]A. Carmichael, op. cit., p. 8.

crimination among superior students would be possible. Exclusion of these items would prevent an extension of the curve at the upper end of the distribution. In a somewhat lesser degree, the same criticism was true for the component, Following Directions, for which the distribution of scores was skewed negatively at the .05 per cent level of significance.

Negative skewness of the distributions of scores for Word Form, Word Recognition, and Following Directions in the Elementary Test, Form AA, was sufficient to jeopardise the value of the test as an effective diagnostic instrument for Edmonton schools.

Except for Interpretations, the components were skewed negatively, but represented no significant deviation from normality.

The distribution of Total Reading scores approached the normal curve. This tendency characterizes most good tests. However, only four of the seven components exhibited normality in their distributions of scores. The divergence from normality on the part of the remaining components indicates two possibilities: the items of these components are weak or are insufficient in number.

Significant skewness of a negative nature indicated those parts of the test that were too easy for the Edmonton sample. This suggests that the curriculum of the pupils on whom the California Reading Tests were standardized does not require the Edmonton schools' level of achievement. Therefore, the tests will deal unfairly with superior members in any group of Edmonton pupils.

Grade VII sample

Table X summarizes the results of tests for skewness and their significance for the grade VII distributions of scores in Vocabulary and Comprehension and the seven components of the diagnostic profile.

The normality of the distributions of scores for the Vocabulary and Comprehension sections attained by the grade VII sample suggests that the Intermediate test, on the whole, is good. The measurement of Skewness in Vocabulary and Comprehension represent departures from normality that are relatively mild and non-significant.

The range of difficulty covered by the test items in the components of Science, Social Science, General, Reference Skills and Interpretations, appeared to suit the sample, for the resulting distributions of scores exhibited no significant deviation from normality.

The other component parts may not be so well constructed, however. The extreme negative skewness of the distributions of scores for the components, Mathematics and Following Directions, suggests

that these tests were far too easy for the sample and failed to discriminate among the abler members of the group.

TABLE X

SKEWNESS OF SCORES OF VOCABULARY AND COMPREHENSION SECTIONS AND THE SEVEN COMPONENTS OF THE DIAGNOSTIC PROFILE OF THE TEST FOR GRADE SEVEN

Reading Skills	S.	S.E.	C.R.	Level of Significance
Sections				
Vocabulary	— .94	1.19	— .79	.....
Comprehension	— .64	.81	— .79	.....
Components				
Mathematics	—1.23	.29	—4.24	.01
Science	.21	.32	.66	.....
Social Science	— .54	.45	—1.20	.....
General	— .23	.27	.85	.....
Following Directions	— .59	.21	—2.81	.01
Reference Skills	— .28	.23	—1.22	.....
Interpretations	— .11	.50	— .22	.....

NOTE: S—Skewness; S.E.—Standard Error of Skewness; C.R.—Critical Ratio.

The writer agrees with the authors who point out in the test manual that "because of the limited number of items (10 to 30), scores on the seven sections of each test should be used only as guides to indicate the presence of student difficulties in the seven major diagnostic areas.[14] Nevertheless, when measuring the achievement of 196 pepole, it seems reasonable to expect less deviation from normality in the distribution of scores than has been shown in the components, Mathematics and Following Directions,

Conclusions and Recommendations

Almost without exception, the normal class in a city school contains pupils whose reading skills vary all along the scale from good to poor. The periodic testing of pupils' reading strengths and weaknesses is a useful practice, particularly if teachers and administrators are ready and able to provide improved reading instruction based on the findings of the tests. Survey and diagnostic tests are designed to assist in the planning of a helpful reading programme in the classroom.

This investigation has sought to answer two questions related to

[14]Tiegs and Clark, op. cit., p. 4.

the reading ability of two samples of Edmonton school pupils tested by the California Reading Tests. A summary of the conclusions and some recommendations follow.

Strengths and weaknesses in the reading of Edmonton children

(1) The mean scores of both grade IV and grade VII sample groups exceeded test norms for Vocabulary, Comprehension, Total Reading, and the estimated norms for the seven component parts, with the exception of grade VII Mathematics. The margin of superiority was less in grade VII than in grade IV.

(2) Scores made by each sample in the seven components of their respective tests revealed a variation in individual grade placement scores of more than seven grades. The grade IV sample varied from below grade 2.0 to above grade 9.0. The grade VII sample varied in grade placement from below 4.0 to above 11.0. Both samples contained pupils whose upper limits of reading ability were not adequately measured. The true range of ability may have varied more than was indicated by the test results.

(3) The relatively low percentages of correct responses obtained by the grade IV sample in the sub-components, Definitions and Directions, Use of Index, Organization of Topics, and Sequence of Events, might point to weaknesses in these skills. Perhaps grade IV teachers in Edmonton should be advised to provide more training in these areas of reading comprehension.

(4) The grade VII sample achieved relatively low percentages of correct responses in the sub-components, Selecting References, Organization of Topics, and Sequence of Events. This suggests possible weaknesses in these skills and hints that Edmonton grade VII teachers might provide more training to improve their students' techniques in these skills.

(5) It should be noted that both samples were weak in Organization of Topics and Sequence of Events.

Goodness of the tests

(1) The normality of the distributions of scores for the Vocabulary and Comprehension sections attained by the two samples suggests that the tests, on the whole, are good.

(2) Departures from normality in the distribution of scores for certain of the components of the two California tests suggest a cautious approach in the use of the tests as diagnostic instruments. Significant skewness of distributions of scores was noted in the components, Word Form Word Recognition, and Following Directions in the California Reading Test, Elementary, Form AA. In the California Reading Test, Intermediate, Form AA, skewness was

significant in the components, Mathematics vocabulary and Following Directions.

(3) The findings in relation to the Edmonton sample indicate that the value of the tests seems to lie mainly in their use in survey programmes with the diagnostic components and sub-components being helpful in suggesting possible strengths and weaknesses in reading ability at the individual or group level.

Recommendations

(1) The relatively low percentage of correct responses obtained by the grade IV sample in the sub-components, Definitions and Directions, Use of Index, Organization of Topics, and Sequence of Events, might point to weaknesses in these skills. Therefore, grade IV teachers should perhaps be advised to provide more training in these areas in order to improve the reading comprehension of their pupils.

(2) The grade VII sample achieved relatively low percentages of correct responses in the sub-components, Selecting References, Organization of Topics, and Sequence of Events. This suggests possible weakness in these skills and hints that Edmonton grade VII teachers might be well advised to place more emphasis on these specific areas of the reading programme.

(3) An examination of scores obtained in the component tests revealed that in each sample, the range of reading ability extended over more than seven grades. While it is difficult to attend to the needs of individuals in a large class with such divergent levels of ability, teachers and administrators are obligated to plan their reading programme with these individual differences in mind.

(4) In the components and sub-components of the tests where many pupils made perfect scores, the provision of more difficult items to ensure measurement of the upper ability levels of Edmonton children seems required.

(5) Local norms should be developed for the main sections and the seven components of the California Reading Tests.

(6) The California Reading Tests should be used as survey tests and as a means of suggesting the reading strengths and weaknesses of groups and individuals. It has not been proven adequate as a precise diagnostic instrument.

BIBLIOGRAPHY

Anastasi, A. *Psychological Testing.* New York, The Macmillan Company, 1954.

Bloom, M. E. et al. *Effective Reading Instruction* (Second Edition). New York, McGraw-Hill Book Co., Inc., 1951.

Burkhart, K. H. "An Analysis of Reading Abilities" *Journal of Educational Research* XXXVIII (February, 1945), pp. 430-439.

Carmichael, A. *A Survey of the Achievement of Alberta School Children in Reading.* M.Ed. Thesis, University of Alberta, 1954.

Coull, W. H. *A Normative Survey of Reading Achievement of Alberta Children in Relation to Intelligence, Sex, Bilingualism, and Grade Placement.* M.Ed. Thesis, University of Alberta, January, 1956.

Cronbach, Lee J. *Essentials of Psychological Testing.* New York, Harper and Brothers, 1949.

Flanagan, John C. *The Fourth Mental Measurements Yearbook.* New Jersey, The Gryphon Press, 1953.

Garrett, H. E. *Statistics in Psychology and Education.* New York, Longmans, Green and Co., Inc., 1953.

Jordan, A. M. *Measurement in Education.* New York, McGraw-Hill Book Co., Inc., 1953.

Lindquist, E. E. *Statistical Analysis in Educational Research.* Boston, Houghton Mifflin, 1940.

Russell, D. H. "Evaluation of Pupil Growth In and Through Reading." *N.S.S.E. Forty-Eighth Yearbook,* Part II, 1949.

Tiegs, E. W. *Progressive Education* (January, 1952).

Tiegs, E. W. and Clark, W. W. *Manual, California Reading Test, Intermediate.* Los Angeles, Calfiifornia Test Bureau, 1950.

Tiegs, E. W. and Clark, W. W. *Manual, California Reading Test, Elementary.* Los Angeles, California Test Bureau, 1950.

Wrightstone, J. W. *Analysis of Intelligence and General Achievement* (Third Grade Classes) and *Analysis of Results Survey of Intelligence and Reading Ability in 7A Classes.* In Leonard Wood, Educational Psychology (Third Edition), New York, Prentice Hall Inc., 1951.

A STUDY TO DETERMINE THE EFFECT OF TRANSIENCY ON GRADE NINE DEPARTMENTAL EXAMINATIONS MARKS

VERNER R. NYBERG
Provost, Alberta

The Problem

The discovery of oil near Leduc, Alberta, in 1947 gave the petroleum industry of this province an impetus that has not yet subsided. Subsequent exploration and discoveries brought in their wake features heretofore unknown. One such feature was the advent of transient workers and their families.

The impact of this influx on the communities concerned was one from which the school did not escape.

As time went on, it became apparent that transiency was not a feature that would soon pass. Each new oil field discovery meant the arrival and departure of the exploration men, then the entry of drilling crews of many companies who were followed by pipeline gangs, service-rig crews, maintenance and supply men and production personnel. In addition, there were those who conducted their own business ventures and followed the oil development to take advantage of the better opportunities for finding work.

The transiency connected directly with oil is just one phase of the problem in Alberta. The development of industry that followed the discovery of petroleum has increased the number of transients, and, judging from appearances, this situation will likely continue for some time.

Census figures indicate that since 1947 there has been a great increase in transiency in Alberta, and it follows that problems arising from the shift in population are greater than before. There seem to be no indications at present that movements of population are going to decrease in the near future.

Purpose of this Study

Transiency could be the cause of many problems pertinent to the school. Any research conducted with limited time and resources must necessarily be carried out within a small and definite range.

The purpose of this study was to determine the effect of transiency on the marks received by grade IX pupils in Alberta on the Departmental Examinations of June, 1953. To state the problem in another way, this study was made to determine whether the

changes resulting from transiency, such as (1) becoming adapted to a new school situation, (2) becoming adapted to a new home life, (3) coming into contact with a new social group, will enhance pupil achievement in grade IX, have a detrimental effect, or have no effect upon it.

The problem is *not* to find out whether the transient pupil, on the average, is a better or poorer student than the average non-transient, but to discover whether he gains or loses or is not affected by a transfer from one school to another.

Procedure

To complete this study, information from a considerable number of grade IX pupils was required. This information included personal data, such as name and age; information concerning schools attended in grades VII to IX and the number of months in each; and the marks obtained by the pupils in each of the subjects included in the grade IX final examinations conducted by the Department of Education.

About 2,500 forms were printed and distributed, chiefly to pupils of schools in Central Alberta. Approximately two thousand cards, containing the personal data and history of schools attended, were returned by the end of June 1953.

The next step was to secure from the records of the Department of Education the marks received by the pupils in the grade IX final examinations. The attendance figures supplied to the Department office by the teachers were also recorded. Since, at this stage, it had not yet been decided exactly which pupils were to be included in the study, it was necessary to copy the marks received by all the pupils who had completed the cards previously mentioned. The personal data supplied by the pupils on the form were checked against the information given to the Department. Cases where records were incomplete were not considered further.

For each pupil so far classified as a transient a corresponding non transient was found. The pairing was done with considerable care because the extent to which the variables of sex, age, mental ability, attendance and type of school attended could be controlled depended upon how closely each transient could be matched with a non-transient. Members of a pair had to be of the same sex, of the same age (within seven months, if possible), of nearly the same achievement in the tests of mental ability (within five percentile points), and of nearly the same attendance (within fifteen days, if possible). In addition, pairs were chosen so that the types of schools attended in each case were nearly the same. The matching, with

respect to this factor, consisted mainly in seeing to it that no pupil who had spent most of his time in a city school was paired with one who had attended mainly a town, village or centralized school. Other factors were set as nearly equal as the choice permitted. For example, pupils from separate schools were paired with each other as often as could be arranged. No set limits with respect to these factors were devised because it was considered unnecessary to do so.

When the pairs, one hundred in all, were established they were closely checked again. To guard against the possibility of giving one group or the other an advantage resulting from small differences being unconsciously but consistently allowed when each of the pairs was constituted, a number of grand totals for each group was struck. The scores on the general test, the attendance in days, the age in months, the time in months spent in each type of school attended in grades VII to IX, and the time in grade IX only, were totalled for each group and differences noted. Changes in the pairs were made so that the grand totals were more nearly the same. Tables showing personal data for each group were set up so that final comparison could be made. Table 1 gives a summary of the statistical analysis of the attendance figures for the transient and non-transient groups and also the age and achievement in the General Test.

TABLE I

RESULTS OF STATISTICAL ANALYSIS OF ATTENDANCE AND AGE FIGURES AND OF PERCENTILE RANKS ATTAINED BY TRANSIENT AND NON-TRANSIENT PUPILS ON THE DEPARTMENTAL GENERAL TEST

Item Analysed	Means		Differences in Means ($M_2 - M_1$)	Standard Deviations		Differences in Deviations	Critical Ratios Pertaining to—	
	M_1 Transient	M_2 Non-Transient		Transient	Non-Transient	Standard	Means	Standard Deviations
Attendance (days)	172.4	174.2	1.80	12.99	12.02	0.97	1.01	0.77
General Test (%ile Ranks	55.28	55.40	0.12	18.05	17.73	0.32	0.05	0.18
Age (years)	15.30	15.30	0.00	8.84	7.84	1.00	0.00	1.43

In view of the low critical ratios found in Table I, it was concluded that there is no significant difference in the average number of days attended by each group, nor is the variability of the attendance of one group significantly different from that of the other. In the case of the General Test and of age, it is readily seen that the groups

are nearly identical. This applies to the variability as well as the mean score. It was concluded that any differences between transient and non-transient pupils in performance on the grade IX examinations is not attributable to differences in attendance and age nor to unequal mental abilities.

Results

Table II gives a summary of the statistical analysis of the marks received by the transient and non-transient pupils on the final examinations. The figures reveal the extent and significance of any differences between the two groups.

In the case of each grade IX subject, a null hypothesis that there was no real difference between the transient pupils and the non-transient pupils was set up. In the light of the critical ratios derived for each subject the null hypothesis was then accepted or rejected.

It should be borne in mind, while studying the figures in Table II, that a critical ratio of 1.98 or over, as applied to the arithmetic means, would indicate a real difference, at the .05 level of con-

TABLE II

RESULTS OF STATISTICAL ANALYSIS OF MARKS RECEIVED BY BOTH TRANSIENT AND NON-TRANSIENT GROUPS IN DEPARTMENTAL EXAMINATIONS

Subject	Means		Differences in Means $M_2 - M_1$	Standard Deviations		Differences in Standard Deviations $CR_1 - CR_2$	Critical Ratios Pertaining to—	
	Transient M_1	Non-Transient M_2		Transient CR_1	Non-Transient CR_2		Means	Standard Deviations
Reading	55.83	55.81	(—)0.02	16.09	16.07	0.02	0.01	0.01
Literature	28.22	28.18	(—)0.04	8.46	8.28	0.18	0.03	0.22
Language	53.34	55.33	1.99	17.15	15.59	1.56	0.85	0.95
Social Studies	48.95	53.89	4.94	17.37	15.88	1.49	2.09	0.89
Mathematics	51.40	54.26	3.86	16.59	17.48	(—)0.89	1.59	0.52
Science	48.81	53.00	4.19	18.69	16.02	2.67	1.70	1.53

fidence, between the transient and non-transient groups. A critical ratio approaching 1.98 in the case of the standard deviations would indicate that there is a great difference in the variability of each group and would cast doubt on any conclusions reached.

The critical ratios given in Table II suggest that only in the case of social studies must the null hypothesis that the two groups are drawn from the same population be rejected. A difference between the means as great as that shown is significant at the .05 level of confidence. In the case of reading, literature, language, mathematics and science, the null hypothesis must be accepted. The difference between the means in each case is attributable to chance or errors of sampling.

In every instance, the difference between the two standard deviations is not significant. It may be assumed, therefore, that the variability of the marks in each subject is much the same.

Findings

In the light of the facts brought out in this study, a number of conclusions may be made. First, the figures in Table II lead one to believe that when a pupil in grade IX transfers from one school to another his final mark in social studies will be lower than if he had not changed schools. One explanation of this finding might be that it is difficult for a teacher who receives a transient pupil to determine how much pertinent information the student absorbed in the previous school. Furthermore, because of the nature of the material, the various sections of the subject are not dealt with in the same sequence in all schools. Some of the transient students, therefore, will be taught the same unit twice but will receive no instruction in another section of the course. Finally, it is more difficult to organize remedial work in social studies than it is in some of the other subjects.

A second conclusion suggested by the data in Table II is that this study did not reveal a significant relationship between transiency and performance in any subject other than social studies. It might be noted at this point that in all subjects containing an organized body of knowledge, the differences, however small, between the transient and non-transient pupils are in favor of the latter. This might indicate a trend which could be verified only by further study.

Finally, it seems reasonable to make the generalization that grade IX pupils in Alberta lose in some fields by moving from one school to another during the term. However, the amount of lowering of the marks, even in the subject where it is greatest, is not enough to be alarming. The better performance by the transients in reading and literature is very small. Suffice it to say that there is a possibility that transiency benefits a pupil in these fields.

FINANCIAL ASSISTANCE AVAILABLE FOR GRADUATE STUDY IN THE FIELD OF EDUCATION AT CANADIAN UNIVERSITIES

STANLEY G. DEANE
Eastglen Composite High School

The Problem

The report of the First Canadian Conference of Deans of Education and Professors of Educational Administration and Supervision, 1955, indicated three needs emerging from conference discussion.[1] Of these the third was a need for greater financial aid to graduate students in educational administration and supervision.

Preliminary to any action that might be taken there was need for a summary of the kinds and amounts of available aid in the form of scholarships, fellowships, bursaries, loans, assistantships, special grants, and paid leaves of absence. Such a summary appears in the following tables. The study was sponsored by the Alberta Advisory Committee on Educational Research.

Collection of Data

Data were obtained as indicated:

1. A survey of the calendars of those Canadian universities offering degree programs in education.
2. A questionnaire to each Dean of Education in Canada regarding aid given in the form of assistantships, grants-in-aid, and special grants.
3. Letters to the Department of Education in each of the ten provinces respecting aid given to employees and to graduates in education generally.
4. Letters to Foundations and to Fellowship Committees listed in every available reference, asking for literature respecting their aid programs, or for confirmation of the information contained in the university calendars.
5. Letters to Teachers' and Trustees' organizations in each province respecting their programs of financial aid.
6. Questionnaires to school boards in Canadian cities having populations of 15,000 or over, respecting sabbatical and other forms of leave for educational study.

---

[1]First Canadian Conference of Deans of Education and Professors of Educational Administration and Supervision, **Report of Proceedings,** Toronto: CEA, p. 7.

7. Letters to service clubs mentioned in any university calendar respecting financial aid given for graduate study in education.
8. Letters of inquiry to selected businesses and industries.
9. Personal and telephone interviews.

TABLE I

POPULATION SAMPLED IN OBTAINING DATA ON FINANCIAL AID AND PERCENTAGE OF RESPONSE

Population	Number Contacted	Percentage of Replies
Universities	18	100%
Departments of Education	10	100%
Foundations, Fellowship Committees	36	100%
Teachers' Organizations	16	94%
Trustees' Organizations	17	88%
Urban School Boards[2] (15,000 population and over)	94	72%
Service Clubs	24	92%
Businesses	9	100%
Miscellaneous	15	87%
Totals	239	86%
Additional Data-Gathering Procedures:		
Personal and Telephone Interviews	31	.....
Follow-up Letters	50	.....

Deliminations of the Study

Field of study. At a number of universities teachers, or others about to become teachers, usually hold a B.A. degree or its equivalent before proceeding to the B.Ed. degree or to graduate work in education. Such persons might conceivably study in a wide variety of fields. In order to limit the fields of study in those areas not specifically designated for education, awards have been included only in those special fields that are usually taught in the senior high schools. These include Languages such as English, French, German, and Latin; and Humanities such as Art, History, Music, Literature, and Philosophy.[3]

In defining the fields of study that might be considered as open to students in education, most foreign languages, Classics, Social Work, Business courses, most of the Social Sciences, and most of the Natural Sciences have been excluded. It was felt that subjects of a

[2]Canadian Education Association, "Leave of Absence for Professional Study for Administrative and Supervisory Personnel", a report prepared for the CEA-Kellogg Project in Education Leadership, December, 1955.

[3]University of Toronto Calendar, Faculty of Arts, 1955-1956, p. 38.

specialized or technical nature require specialized training, and that students in them seldom enter the teaching field.

Financial limits. As it is felt that financial aid has to be fairly substantial in order to attract students into full-time graduate schools, awards of less than $100 have been omitted.

Bachelor of Education degree. In a number of Canadian universities the B.Ed. is considered a graduate degree. At all universities where the B.Ed. is awarded students may enroll for it after obtaining a degree such as the B.A. In order to obtain uniformity in this report, where a prior degree is listed as a requisite, students taking courses leading to a B.Ed. degree have been classified as doing graduate work, whether or not registered in the Graduate School.

Financial Awards

Space does not permit the inclusion of details respecting the awards offered by the individual Canadian universities. Only those awards offered by the University of Alberta are shown in full. A summary of the awards open to all Canadian students and tenable at any Canadian university is shown in Table II. Details respecting any of the awards may be found in appropriate university calendars.

UNIVERSITY OF ALBERTA

I. *Financial Awards Open to Canadian Students for Graduate Study at Any Canadian University*

A. *Scholarships and Fellowships*:
See Table II for summary of these awards.

B. *Bursaries and Loans*:
See Table II for summary of bursaries and loans.

TABLE II

FINANCIAL AWARDS OPEN TO CANADIAN STUDENTS FOR GRADUATE STUDY AT ANY CANADIAN UNIVERSITY

Name of Award	Value	Number	Conditions
Canadian Federation of University Women Junior Fellowship	$1,200	1	Open to women graduates not over 25 years old. Work must be approved.
Canadian Federation of University Women Margaret McWilliam Fellowship	$1,500	1	Open to women graduates not over 35 years old.
Canadian Federation of University Women Professional Scholarship	$1,000	1	Open to women graduates not over 35 years old. Library, education, professional schools.
Canadian Federation of University Women Travelling Fellowship	$1,500	1	Open to women graduates not over 35 years old.
Canadian Federation of University Women	$ 500	to 4	To assist former fellows to continue work previously started under CFUW.
Canadian Social Science Research Council Pre-Doctoral Fellowships	$2,000	about	For graduates doing post-graduate work.
Canadian Social Science Research Council Post-Doctoral Grants in Aid of Research	$ 800	not stated	For senior scholars for travel and research expenses.
Central Mortgage and Housing Corporation Senior Fellowships	Not fixed	to 2	For professional candidates for study of housing and urban development.
Central Mortgage and Housing Corporation Bursaries	$ 800	3	For graduates for studying housing and urban development.
Sir James Dunn Scholarships	$1,000	3	For graduates from elsewhere to study at University of New Brunswick.
Humanities Research Council of Canada Pre-Doctoral Fellowships	$2,000	to 12	For doing post-graduate work in Classics, Languages, Humanities.
Humanities Research Council of Canada Post-Doctoral Grant in Aid of Research	$ 500	Not stated	To assist senior scholars to meet expenses and travel costs.
Imperial Oil Graduate Research Fellowship	$1,250	1	Open to any graduate for research leading to a doctor's degree.

TABLE II—*Continued*

Name of Award	Value	Number	Conditions
Leonard Foundation Scholarships*	Not stated	Not stated	For British subjects, white race, Protestant religion. Leads to B.Ed.
Princess Alice Foundation Fund Scholarships	$1,500	Several	Preferably for women graduates, under 35 years of age.
Woodrow Wilson Fellowships	$2,250	150	Candidates nominated by University staff member.
BURSARIES AND LOANS			
Dominion-Provincial Student Loan Funds	$ 300		Loans available to full-time students in most degree courses. Available in P.E.I., N.S., N.B., Sask. as graduate loans. In P.Q., Man., Alta., B.C. for undergraduates only.
Dominion-Provincial Student-Aid Bursaries	$ 250 and $ 500		Type B bursaries for full-time Ont. university students.
D.V.A. and Armed Services Benefits			Under special circumstances benefits may be extended for graduate study.
I.O.D.E. Educational Foundation Revolving Loan Fund	$ 400		To assist any worthy young person. Not restricted to college education.

*Awards marked with a star (*) are for students studying for a B.Ed. degree.

II. *Financial Awards Open to Alberta Students for Graduate Study at Any Canadian University*

A. *Scholarships and Fellowships*:

1. John Walker Barnett Memorial Scholarship.
   - Field of Study: Education.
   - Value: $500.
   - Number: One annually.
   - Duration: One academic year.
   - Conditions: Open to holders of a B.Ed. degree who are proceeding to graduate work. Holders must be bona fide residents of Alberta, and must register for intramural study in a graduate school within two years following the award.
   - Tenable at: Any recognized university.
   - Donor: Alberta Teachers' Association.
   - Apply to: Alberta Teachers' Association, Barnett House, 9929 - 103 Street, Edmonton, by July 15.

2. Clarence Sansom Memorial Scholarship.

Field of Study:	Education.
Value:	$500.
Number:	One annually.
Duration:	One academic year.
Conditions:	Awarded to the winner of the Clarence Sansom Memorial Gold Medal in Education, for the highest general proficiency in the final year of the B.Ed. program. Payable upon registration for intramural graduate study, within two years following the award.
Tenable at:	Any recognized university.
Donor:	Alberta Teachers' Association.
Apply to:	Alberta Teachers' Association, Barnett House, 9929 - 103 Street, Edmonton, by July 15.

B. *Bursaries and Loans*:

1. Alberta Teachers' Association Professional Assistance Loans.
A fund has been set up by the Alberta Teachers' Association to provide loans to students in need of financial assistance to continue their preparation as teachers through intramural study. Priority for loans will be given to teachers in the field who have completed at least three years of professional education. Loans are interest free, but must be insured against loss due to death or disability. Apply to the Alberta Teachers' Association, Barnett House, 9929 - 103 Street, Edmonton, by July 15.

C. *Leaves of Absence*:

Employer	Length of Leave	Salary Provisions	Remarks
Department of Education	6 weeks	Full salary	
Calgary Public	1 year	$2,400	Sabbatical leave
Edmonton Public	1 year	$1,200	Sabbatical leave
Edmonton Separate	7 months	None	Individual cases. Some tuition, and expenses paid.
Lethbridge Div. No. 7	1 year	$1,200	Sabbatical leave
Lethbridge S.D. No. 51	1 year	$1,800	Sabbatical leave
Medicine Hat	6 weeks 1 year	50% salary $1,500 or 40%	Sabbatical leave
St. Mary's River	June 10 to 30	5 days' salary	Summer school semester plan.
Taber	1 year	$1,200	Sabbatical leave
Warner County	1 year	$1,200	Sabbatical leave

III. *Awards Tenable Only at the University of Alberta*

A. *Scholarships and Fellowships:*

1. Du Pont of Canada Scholarship.
   - Field of Study: Secondary School Science Teaching.
   - Value: $1,500 ($2,100 if a married man).
   - Number: One annually.
   - Duration: One academic year.
   - Conditions: Awarded according to one of the following plans at the option of the University:
     - (1) To a graduate or an undergraduate in an honours course in science or in a course in which science has been a major subject and who agrees to enroll for the following year for training as a secondary school science teacher.
     - (2) Three summer school scholarships of $500 each to secondary school teachers for additional training in science. Recipients should be free to select any university conducting appropriate summer science programs.
     - (3) To a science specialist already teaching in secondary school, whose ability would be improved by a year's postgraduate work in science.
   - Donor: Du Pont of Canada Limited.
   - Apply to: The Dean, Faculty of Education, University of Alberta.

2. John Macdonald and T. E. A. Stanley Scholarships.
   - Field of Study: Education.
   - Value: $500 each.
   - Number: Two annually.
   - Duration: One academic year.
   - Conditions: Awarded to residents of Alberta who are graduates of other faculties and are proceeding to a B.Ed. program as a preparation for teaching.
   - Donor: Alberta Teachers' Association.
   - Apply to: Alberta Teachers' Association, Barnett House, 9929 - 103 Street, Edmonton, by July 15.

3. Stapells Graduate Scholarship.
   - Field of Study: Language, Literature or Social Sciences.
   - Value: $250.
   - Number: One annually.
   - Duration: One academic year.
   - Conditions: Open to graduates of the University of Alberta who register in a full intramural program. Details of the proposed field of study must be given, together with confidential reports from three instructors.
   - Donor: Mr. Frederick Stapells.
   - Apply to: The Registrar, University of Alberta, by April 15.

4. Robert Tegler Research Scholarship.
   - Field of Study: Unrestricted.
   - Value: $900.
   - Number: One annually.
   - Duration: One academic year.

Conditions: Open to graduates of the University of Alberta. Details of the chosen field of study together with confidential reports from three instructors must be supplied.
Donor: The Robert Tegler Trust.
Apply to: The Registrar, University of Alberta, by April 15.

5. University of Alberta Research Scholarships.
Field of Study: Unrestricted.
Value: $900.
Number: Two; not always annually.
Duration: One academic year.
Conditions: Open to graduates of any Canadian university. Details of the chosen field of study together with confidential reports from three instructors must be supplied.
Donor: Board of Governors of the University of Alberta.
Apply to: The Registrar, University of Alberta, by April 15.

B. *Bursaries and Loans*:

1. Alberta Government Bursaries.
Field of Study: Education.
Value: $400 each, plus tuition fees.
Number: To a maximum of 40 annually.
Duration: One academic year.
Conditions: Granted to graduates of the University of Alberta or of other universities who enter the Faculty of Education at Alberta to obtain certification for teaching at the senior high school level. Candidates must undertake to teach at the high school level in the public schools of Alberta for two consecutive years following completion of the one year of training.
Donor: The Department of Education of Alberta.
Apply to: Coordinator of Teacher Education, Department of Education, Edmonton.

C. *Assistantships*:

Number	Kind	Weekly Work Required	Value
1	Research assistantship	10 hours	$ 520
1	Clinical assistantship	10 hours	$ 320
1,200 hours	Marking and reading assistantships	48 hours	$1,200

NOTE: Research grants are available in limited numbers and amounts through the Alberta Advisory Committee on Educational Research, University of Alberta.

Tabular Presentation of Data

In the tables that follow, the awards offered by the eighteen universities covered by this study are summarized. Table III shows the numbers and approximate values of scholarships, fellowships, and bursaries granted by various donors for graduate study at *any* Canadian university. In some instances awards are made in groups of no specified number or amount. Where this occurs, the letter "G" is used to indicate a group of an unspecified number and

amount. The table also differentiates between awards for strictly graduate study and those granted to holders of a previous degree who are studying for a B.Ed.

Table IV continues the classification in Table II by listing the numbers and approximate values of awards made by various donors for graduate study at the specific Canadian universities. In this table strictly graduate awards are indicated outside parentheses while awards for a B.Ed. program are within parentheses.

Table V shows all scholarships, fellowships, and bursaries available by universities and in the various fields of study. An examination of Table V indicates that in the whole of Canada a total of twenty-three single awards and three groups of awards are available to students in education doing strictly graduate work. It should be apparent that in each of the other fields of study, although education students may be free to apply for an award, they are in direct competition with other students, many of whom are specialists in the field in which the award is being offered. Those awards that are unrestricted as to field of study are open to the total university student population of Canada.

TABLE III

NUMBERS AND APPROXIMATE VALUES OF SCHOLARSHIPS, FELLOWSHIPS, AND BURSARIES GRANTED BY VARIOUS DONORS FOR GRADUATE STUDY AT ANY CANADIAN UNIVERSITY

Open to Students of	Universities	Departments of Government	Foundations and Fellowships	Teachers and Trustees	Service Groups	Businesses	Memorials and Persons
All Canada —(Grad)			32—$64,000		8—$7,200	4—$3,650	3—$3,000
		2—G	4—G			1—G	
(B.Ed.)							1—G
Newfoundland							
Prince Edward Island							
Nova Socta —(Grad)							
(B.Ed)		1—G					
New Brunswick —(Grad)		1—G					
(B.Ed.)							
Quebec —(Grad)				1—G			
(B.Ed.)		2—G					
Onatrio —(Grad)		4—$6,000					1—$3,000
	1—G						
(B.Ed.)		1—G					
Manitoba —(Grad)	2—$ 800				1—$ 150		
(B.Ed)							
Saskatchewan —(Grad)				1—$ 500	1—$ 500		
(B.Ed.)							
Alberta —(Grad)				2—$1,000			
(B.Ed)							
British Columbia—(Grad)	1—$ 200		1—$ 125		3—$ 450	1—$ 300	
(B.Ed.)							
TOTALS —(Grad)	3—$1,000	4—$6,000	33—$64,125	3—$1,500	13—$8,300	5—$3,950	4—$6,000
		4—G	4—G	1—G		1—G	
(B.Ed)		4—G					1—G

Table IV

NUMBERS AND APPROXIMATE VALUES OF SCHOLARSHIPS, FELLOWSHIPS, AND BURSARIES GRANTED BY VARIOUS DONORS FOR GRADUATE STUDY AT SPECIFIC UNIVERSITIES

Tenable at	Universities	Departments of Government	Foundations and Fellowships	Teachers and Trustees	Service Groups	Business	Memorials and Individuals	Miscellaneous
Memorial								
Acadia							3—$ 700	
Dalhousie	1—$ 500				1—$ 200 (1—$ 100)	1—$1,500	1—$ 100	
St. Francis X						1—$ 150		
Mt. Allison							(1—G)	
St. Joseph's								1—G
New Brunswick						1—$1,500	1—$ 750	
Bishop's								
Laval	1—G					1—$1,500		
McGill	2—G				8—$2,450 1—G		10—$3,950 2—G	
Montreal						1—$1,500		1—G
Ottawa								
Toronto	1—G					6—$8,000	7—$4,750 (2—$ 250) 1—G	
Manitoba		(6—$1,500)		(2—$ 400)	(1—$ 100)	1—$1,500		
Saskatchewan						1—$1,500	1—$ 500	
Alberta	2—$1,800	(40—$24,000)		(2—$1,000)		1—$1,500	2—$1,150	

British Columbia			2—$1,000	(5—$ 700)	1—$ 100 (7—$ 700)	1—$1,500 1—G	4—$ 650	
TOTALS	3—$2,300 4—G	(46—$25,500)	2—$1,000	(9—$2,100)	10—$2,750 (9—$ 900) 1—G	17—$23,150 1—G	29—$12,550 (2—$ 250) 3—G(1—G)	2—G

NOTES: 1: The letter "G" indicates a group of awards.
2. Numbers outside parentheses indicate awards for graduate degree programs.
3. Numbers inside parentheses indicate awards for B.Ed. program only.
4. Amounts shown are only approximate. If awards are stated as the interest from a fund, estimates are made at 3%. Values are not shown for groups of awards, as the numbers awarded are not usually stated.

TABLE V

SCHOLARSHIPS, FELLOWSHIPS, AND BURSARIES AVAILABLE IN VARIOUS FIELDS OF STUDY AT CANADIAN UNIVERSITIES

Tenable at	Unrestricted	Several Fields	Education		Humanities	Languages	Others
			Grad.	B.Ed.			
Any University	3 3 (Man.) 1 (Sask.) 6 (B.C.)	17 4—G	G (N.B.) G (P.Q.) G (Ont.) 5 (Ont.) 1 (Sask.) 2 (Alta.)	1—G G (Ont.)	1		25 2—G
Several Universities	3			G (N.S.) 2G(P..Q.)			
Memorial				-			
Acadia		1			1	1	
Dalhousie	2		1	1		1	
St. Francis					1		
Mt. Allison				1—G			
St. Joseph's		1—G					
New Brunswick			1		1		
Bishop's							
Lavel	1—G		1	2—G			
McGill	14 4—G	3 1—G	2			1	
Montreal		1—G	1				
Ottawa							
Toronto	5 1—G	1 1—G	5	2	2		
Manitoba			1	9			
Saskatchewan		1	1				
Alberta	3	1	1	42			
British Columbia		2 1—G	1	12	2		3
TOTALS	40 6—G	26 9—G	23 3—G	66 8—G	8	3	28 2—G

NOTES: 1. The letter "G" indicates a group of awards.

2. Restricted awards have the name of the province in parentheses in which the award is available.

Table VI

SCHOLARSHIPS, FELLOWSHIPS AND BURSARIES AVAILABLE TO STUDENTS HOLDING AN UNDERGRADUATE DEGREE AND PROCEEDING TO A BACHELOR OF EDUCATION DEGREE

Donor and University Where Tenable	Number of Awards	Value
Leonard Foundation (Tentable at most universities)	Several	Not stated
I.O.D.E. (Dalhousie)	1	$100
Department of Education, Nova Scotia (Five universities)	All Students	Fees
Herbert S. Sharp (Mount Allison)	Several	$500 each
Department of Health and Social Welfare, Quebec	Several	$400 each
Provincial Government of Quebec (Most universities)	Several	$1,200 each
Hugh W. Bryan, and John T. Crawford (Toronto)	2	$250
Department of Education, Ontario (Any university)	Several	$250 and $500
Department of Education, Manitoba	6	$1,500
Manitoba Teachers' Society	2	$ 400
I.O.D.E. (Manitoba)	1	$ 100
Alberta Teachers' Association*	2	$1,000
Department of Education, Alberta (Alberta)	to 40	$400 plus fees
B.C. Parent-Teacher Federation	1	$100
B.C. Teachers' Federation Groups	5	$700
I.O.D.E. Chapters	5	$500
National Council of Jewish Women (British Columbia)	1	$100

*Macdonald and Stanley scholarships.

TABLE VII

ASSISTANTSHIPS AND SPECIAL GRANTS AVAILABLE FOR GRADUATE STUDY IN EDUCATION AT CANADIAN UNIVERSITIES

Granted by	Assistantships		Grants	
	Number	Value	Number	Value
Memorial				
Acadia	4	$ 950		
Dalhousie	4	$1,500		
St. Francis				
Mt. Allison	3	$ 400	Many + 2	Fees in Ed. $ 228
St. Joseph's			4	$ 600
New Brunswick	3	to $800		
Bishop's				
Laval	2	$2,000	2	$ 425
McGill				
Montreal			2	$1,000
Ottawa	2	$2,000	2	$ 200
Toronto	6	to $7,900	1	$ 600
Manitoba	1	$1,000	1	$ 50
Saskatchewan	1	$ 450		
Alberta	Several + 2	to $1,200 $ 840		
British Columbia	2	$1,650		
TOTALS	30 + Several	to $20,690	14 + Many	$3,103 + Fees in Ed.

Table VIII

SCHOOL BOARDS GRANTING LEAVES OF ABSENCE FOR FURTHER EDUCATIONAL STUDY IN CANADIAN CITIES OF 15,000 POPULATION AND OVER

Number of Boards Reporting	Grant Leave Up To 6 Weeks		Grant Leave For 7 Months to 1 Year			Other Financial Aid Given	Previous Service Required	Considering Granting Leave	Grant No Leave
	Without Salary	Full Salary	Without Salary	Full Salary	Part Salary				
8 in Atlantic Provinces		4	6	1		1	1—On merits 1—1 to 4 yr. 6—Not stated		
11 in Quebec	1	4	5	1		3	2—On merits 2—1 to 4 yr. 7—Not stated		4
31 in Ontario	10	8	12	1	9	4	4—On merits 2—1 to 4 yr. 4—5 yr. & over 21—Not stated	2	8
18 in Western Provinces	2	5	11	1	12		2—to to 4 yr. 11—5 yr. & over 5—Not stated	1	
TOTALS	13	21	34	4	21	8	7—On merits 7—1 to 4 yr. 15—5 yr. & over 39—Not stated	3	12

Table VI elaborates upon the awards granted to students who already hold one undergraduate degree and are proceeding toward a B.Ed. degree. This information is also contained in the B.Ed. column in Table V.

In the original report two tables were included dealing with loans available for graduate study at the Canadian Universities. Space does not permit their inclusion here. Table VII shows the extent to which assistantships and special grants are made available for graduate study. In a number of instances the amounts or numbers are flexible to meet the requirements of the university department concerned.

Table VIII shows the number of school boards in Canadian cities of 15,000 population and over that grant leaves of absence to their employees for educational study. Such leaves might be used for undergaduate study, for study abroad, and for similar purposes as well as for graduate study.

No attempt was made in the report to the Second Canadian Conference to draw conclusions from the data presented. The purpose of the report was to present the information so that action by the universities might be soundly based.

BIBLIOGRAPHY

Canadian Education Association. *Leave of Absence for Professional Study for Administrative and Supervisory Personnel.* Report prepared for the CEA-Kellogg Project in Educational Leadership, December, 1955. Toronto: Canadian Education Association, 1955. Mimeographed.

First Canadian Conference of Deans of Education and Professors of Educational Administration and Supervision. *Report of Proceedings.* Toronto: Canadian Education Association, 1955. Mimeographed.

University of Toronto Calendar. *Faculty of Arts, 1955-1956.* Adapted from p. 38.

TO TEACH, OR NOT TO TEACH

J. D. Aikenhead
Faculty of Education
University of Alberta

Why do some young people choose to teach, and some do not? Why do teachers stay teaching? What reasons impel some teachers to leave the classroom, try out business, and later return to teach? What influences cause men and women holding a permanent teacher's certificate to leave the profession?

These questions about teacher recruitment and retention are basic to a solution of the teacher shortage in Alberta. The estimated shortage for Alberta when schools opens in September 1956, is 1,243, and for 1960 an aggregate of 6,382.[1] A Canadian educator stresses the quality factor when he writes that 1,000 of the 4,000 training to teach each year would be screened if there was no teacher shortage.[2]

Other studies have been made in Alberta on the problems of recruitment. Clarke and Pilkington reported on reasons given by education students for selecting teaching as a career.[3] Melsness gave findings on a more limited sample.[4] This paper presents the present writer's research covering both problems. Part I is a summary of a doctor's dissertation[5] on teacher recruitment in the four western provinces. Part II deals with teacher retention in Alberta.

1. Recruiting Teachers

This research aimed to find out why young people in the four western provinces choose to teach, or not to teach. Young people who were studying in the last two years of high school or the first two years past high school completed 3,807 questionnaires, a return of over 82 per cent. To insure an adequate cross-section assistance was given by principals, school superintendents, officials of the Departments of Education, university officials, the General Secretary of the British Columbia Teachers' Federation, as well as many others. A grant from the General Research Council of the University of Alberta assisted.

---

1 **Facts About Education's Number One Problem,** Conference Report (December, 1955), p. 6.

2 **Yearbook of Education,** p. 233.

3 S. C. T. Clarke and W. Pilkington, "Why Teaching is Chosen as a Career" **The Alberta Journal of Educational Research** (March, 1955), pp. 44-52.

4 H. C. Melsness, "More Information, Please" **The Alberta School Trustee** (May, 1953), pp. 8-9.

5 **J. D. Aikenhead, To Teach, or Not To Teach.**

The dissertation includes 113 tables with as many pages of supporting narrative. Since excerpts would make this report unduly long, the established conclusions are listed.

1. Young people stated they avoided teaching mostly because of monotony, slow promotions, few highly paid top positions, and low salaries.

2. The teacher shortage is greatest where the salaries are the lowest.

3. The shortage is greatest where there are fewer larger units of school administration, or where these units have not been operating for long periods.

4. Young people who do not plan to teach were not deterred to a marked degree by an alleged lack of prestige, critical parents, rude children, or the hard work of the classroom.

5. Almost no students were prevented from finishing high school, or entering college, by the cost or difficulty of finishing high school.

6. Students chose to teach mainly because they liked children and young people, security, teaching hours and holidays. Next in order of importance were doing good for others, the prestige of the teaching profession, a satisfactory salary and adequate sick benefits with pension.

7. The opportunities afforded by teaching for travel and self-improvement did not influence many students.

8. Bursaries tend to increase the numbers training to teach.

9. Small rural high schools send the largest proportion of young people to train for teaching.

10. Pamphlets from Departments of Education are influential in persuading young people to enter the teaching profession.

11. Most young people decide to teach when sixteen to nineteen years of age, but a significant number decide shortly before or after.

12. Teachers come from homes where the level of formal schooling is below that of their peers who do not plan to teach.

13. The basic two-year training for a permanent certificate tends to encourage students to plan for two year's training.

14. Students are not always given accurate information on teachers' salaries.

15. High school students might have more opportunities to teach in the lower grades in their school under capable teachers.[6]

These findings show why young people in Western Canada choose to teach or to avoid teaching. However, keeping good teachers in the classroom is the more vital problem.

[6]Ibid., pp. 179-180.

2. Retaining Teachers

According to a report of the National Conference of Canadian Universities the "most difficult single problem that must be solved . . . is the teacher shortage."[7] Both Stinnet[8] and the N.E.A.[9] give data which are alarming. Dr. Garnet Page of the Chemcial Insitute of Canada, shows that the classrooms must have science teachers to train persons for industry.[10] Page also points out how Russia sends her surplus scientists, fully indoctrinated, to undeveloped countries. In Russia almost four times as many young people are training at university level as in Canada, when the populations are compared.[11] An Alberta study was completed by Murray on annoyances which cause teachers to leave the profession.[12]

Teachers, Returned-teachers, and Ex-teachers

The present study was made possible with the help of Mr. W. E. Frame, Chief Superintendent of Schools, Government of Alberta, that of several school superintendents, and a grant from the General Research Council of the University of Alberta. A total of 120 persons were interviewed from Peace River to Lethbridge, St. Paul, Oyen, Brooks to Banff. All persons were adults who held permanent teacher's certificates. The 120 persons were equally divided into three groups. Forty were teachers with permanent certificates, regularly employed since they began their teaching careers. This group will be referred to as "teachers". Another 40 teachers holding permanent certificates had left the classroom for a full year or more to earn their living at some other vocation before deciding to return to teach. This group is termed "returned-teachers". (Married women who left to keep house, or women who left to marry were not interviewed.) The third group of 40 ex-teachers appear to have left the profession permanently. (Again, married women who left for housekeeping duties, or women who left to marry, were not included in the study.)

Marital Status: Dependents

More married men returned to the classroom after trying some other work. This one would expect. Single men were slower to return to teach, as indicated in Table I. The reasons given during

7The National Conference of Canadian Universities, Proceedings, 1955, p. 63.

8T. M. Stinnet, "The Teacher Supply," **The School Executive** (January, 1955), p. 69.

9"Teacher Supply and Demand Report," **Journal of Teacher Education** (March, 1955), pp. 23-71.

10Garnet T. Page, "Science and Mathematics Teaching in our Secondary Schools," **Chemistry in Canada** (March, 1956), pp. 35-37.

11Garnet T. Page, "Education and Professional Manpower in the U.S.S.R.," **Chemistry in Canada** (May, 1956), pp. 35-39.

12Thomas H. Murray, **An Investigation into the Annoyances and Frustrations Which Cause Alberta Teachers to Quit Teaching, The Alberta Journal of Educational Research (September, 1955), pp. 17-23.**

the interviews by all the men were to the effect that the work was not as lucrative as promised, that the breadwinner was away from home too much, that working conditions affected health adversely, that pressure to achieve quotas was ruining health, and that most often the standard of living was lower. A few men admitted, "I wasn't cut out for business and it cost me a lot to find out."

It would seem that among the ex-teachers married women do not likely leave the profession to accept other employment. (See Tables V to VIII.)

Men have more dependents than women and women with dependents seem to favor the classroom. Table II shows that there were no married women among the ex-teachers. The interviews gave more information. Several men mentioned they would have stayed out of the classroom if they hadn't a family. As one man said, "If you are married you can only be out of work so long."

TABLE I

MARITAL STATUS OF PERSONS INTERVIEWED

Status	Teachers		Returned-teachers		Ex-teachers	
	Men	Women	Men	Women	Men	Women
Married	10	7	24	4	29	.....
Widowed	.....	1	1	1	2	.....
Divorced	.....	.....	1	1	1	.....
Single	5	17	3	5	1	7

Professional and Academic Training

Table III shows that most women had the minimum academic and professional training. Those women actually teaching regularly had more professional training and a superior background when compared with the women in the returned-teacher and ex-teacher groups. The numbers interviewed were too meagre to allow a careful comparison between the men in the teacher-group and the returned teacher groups. The number of men holding degrees is significant in the ex-teacher group. Three held one professional degree, four one academic degree, two had earned two degrees, one held one professional and one academic degree, and one ex-teacher held two professional and one academic degree.

TABLE II

NUMBER OF DEPENDENTS OF PERSONS INTERVIEWED

	Teachers									
	Men					Women				
	Number of Dependents					Number of Dependents				
	0	1	2	3	4 plus	0	1	2	3	4 plus
Married	...	2	1	5	2	5	1	1	...	...
Widowed	...	...	...	...	...	...	1	...	...	...
Single	4	1	...	...	...	16	1	...	...	...
	Returned-teachers									
Married	1	3	4	7	9	2	1	...	...	...
Widowed	...	...	...	1	...	2	...	...	...	...
Divorced	1	...	...	...	...	...	...	1	...	...
Single	3	...	...	...	...	4	1	...	...	...
	Ex-teachers									
Married	1	2	8	12	6	...	...	...	...	...
Widowed	1	1	...	...	...	...	...	...	...	...
Divorced	1	...	...	...	...	...	...	...	...	...
Single	1	...	...	...	...	7	...	...	...	...

Teaching and Business Experience

Table IV shows most teachers were without business experience. The returned-teachers showed a wide range within, and outside, the classroom. In the ex-teacher group about half of the men had between six and ten years of teaching experience, and two thirds of the sample had been in business between six and fifteen years. Of the seven women interviewed four had taught more than five years, and one had taught 25 years. This women left the profession in good standing, of her own volition, with credits past a bachelor's degree. Data such as this show the need for more time for research broad enough to find why so many good teachers leave when they are such an asset to the children in Alberta.

Respondents' Opinions

Twelve questions were asked covering reasons why teachers

teach, and 14 reasons were proposed to persons who had left the classroom. The reasons are shown in Tables V to VIII. As mentioned, the questionnaire was the open-end type and comments were noted as the interview progressed, and later recorded. Each person was asked to give the extent of influence for each reason. For example, when a returned-teacher was asked by the present writer, "Did you return to teach because teaching offers security?" and gave the answer as "Yes", the interviewer then determined where this reason could be located on a five-point scale. That is, in this case the returned-teacher was asked how much this reason influenced him to return to the classroom. Was it the deciding factor (4 points), or very strong (3 points), or definite (2 points), or little (1 point), or no influence (0 points). Later all the responses of the 40 persons interviewed in each group were taken in the five-point extent-of-influence scale and multiplied by 4, 3, 2, 1, and 0 respectively. These products were added to secure a "weight-total" for each reason for men and for women. This weighted-total not only shows the extent of the influence of each reason, but allows a comparison that is somewhat quantitative.

TABLE III

YEARS OF PROFESSIONAL AND ACADEMIC TRAINING OF PERSONS INTERVIEWED

Years professional training	Teachers		Returned-teachers		Ex-teachers	
	Men	Women	Men	Women	Men	Women
1	4	18	13	7	25	7
2	3	4	6	3	1	.....
3	2	1	5	.....	1	.....
4	6	1	3	1	4	.....
5	.....	1	1	.....	2	.....
7	.....	.....	1	.....	.....	.....
Years academic training						
Gr. XI	.....	.....	.....	.....	1	.....
XII	7	20	19	11	22	7
plus 1	1	2	1	.....	1	.....
2	.....	1	3	.....	2	.....
3	2	.....	2	.....	5	.....
4	4	2	4	.....	.....	.....
5	1	.....	.....	.....	2	.....

TABLE IV

YEARS OF TEACHING AND BUSINESS EXPERIENCE OF PERSONS INTERVIEWED

Years teaching experience	Teachers		Returned-teachers		Ex-teachers	
	Men	Women	Men	Women	Men	Women
2	.....	1	.....	.....	2	.....
3	.....	2	1	.....	2	1
4	4	4	4	.....	3	2
5	.....	4	1	2	2	.....
6 to 10	2	4	9	5	16	2
11 to 15	1	6	4	3	5	1
16, plus	8	4	10	1	3	1
Years business experience						
0	11	22	.....	.....	.....	.....
1	1	.....	5	3	.....	.....
2	.....	2	4	5	1	2
3	1	.....	3	1	1	1
4 to 5	1	1	5	1	5	1
6 to 10	.....	.....	8	1	10	2
11 to 15	1	.....	2	.....	13	1
16, plus	.....	.....	2	.....	3	.....

Reasons Given for Teaching

Men teach mainly because they like children and young people, as shown in Table V. All the other reasons are ranked for the men respondents. Almost half the men remarked, "I like to teach. That's it." Two other reasons have equal weight, altruism and a liking for colleagues. Holidays, hours and salary appear to be only half as persuasive as a liking for youngsters.

Women teach too because they like their pupils and students as a first reason. However, this ranking for the men does not coincide with that for the women. For women the cluster of reasons which covers security aggregates 189, while the total for men is 66. Even with the larger number of women the figure is significant. Women give a wider variety of responses on the extent of influence for each reason. Men tended to mark either extreme on the five-point scale.

Reasons for Leaving Given by Returned-teachers

The reasons given by these forty persons, ranked for the 29 men, are listed in Table VI. As mentioned, women who left to marry were not interviewed. The table shows that for the men low salaries

not only lead the list but were almost four times as important as slow promotions, which rank second. Only two other reasons seem to influence men strongly: not many highly paid top positions, and the subjective nature of teaching. The weighted totals show that financial reasons far outweigh other influences: 143 to 72 respectively. For women the reasons are not ranked as listed in the table, though salaries were judged most important. Women gave as the next most persuasive reasons the monotony of teaching, large classes, and substandard living conditions in some parts of the country. The other reasons listed in the table were not considered seriously by the women. One woman stated:

> An itinerant family caused a row to embroil the whole community. I got out at the end of June to take work in another town in business. I was sure the trouble making family would leave and I could get my old job back, but if I don't, there were lots of others.

One man explained:

> I was given an attractive offer selling, a 23 per cent increase in salary, expenses, and a new car to drive, week-ends too for the family, with a commission over the salary. My wife and I decided to try it. I could

TABLE V

REASONS GIVEN FOR TEACHING: TEACHER GROUP

Reason	Weighted total	
	Men	Women
I like children and young people	42	77
Teaching offers security	32	62
I like to teach. The work has an absorbing appeal for me	28	20
I feel I do good to other people as a teacher	26	45
I like the teachers I know	26	32
The holidays appeal to me	21	34
I like the hours	20	41
The salary satisfies me	18	38
I believe teaching has prestige	13	20
Pensions and sick benefits seem satisfactory	8	22
A permanent teacher's certificate is valuable to a man, who can leave teaching to take a chance in business, and always return to teaching as a sure means of earning a living . . . . the same is true for a woman; and further she may marry and teach, or teach as a widow	8	67
I teach because I cannot do heavy physical labor	.....	6

TABLE VI

REASONS GIVEN FOR LEAVING TEACHING: RETURNED-TEACHERS

Reason	Weighted total	
	Men	Women
Salaries for teachers were too low	92	26
Promotions were slow in teaching	25	1
There are not many highly paid "top" positions	19	1
I could not prove my efficiency as a teacher	16	0
Living conditions in the country did not suit me	10	8
Personal freedom was often restricted on hours for leisure, friends, types of amusement, place to live, joining certain groups, pressure to overload me with community chores that would not ordinarily be taken by one person	10	2
Teaching did not have prestige	10	0
Classes were too large to allow a teacher to do good work	9	8
Teaching was too monotonous for me	9	15
Pensions were low after long service	7	3
Pupils' parents criticised teachers too much	5	0
A few children were rude and I did not like this	2	0
Teaching was too hard work	2	0
A large percentage of teachers never marry	0	1

always come back to teach. After a year and a half the firm started to cut my expenses. I said I'd quit. They restored the cuts. I started to look for my old job, but that city wouldn't take a teacher back on who left for business. I got this job in the country and like it. I was in business for two years. I saved a good stake.

These 29 men and 11 women changed their minds and returned to teach. Table VII shows that they wanted steady employment. When weighted totals are considered, 254 is the figure for men and 80 for the women. In consideration of the number of men and women, these totals show about the same emphasis. It is interesting to note that in business some men found that teaching had prestige. One returned man said, "I never mixed much with business people when I taught. In business I had to, and found the better people respected teachers." Teachers were also persuaded to return to

the classroom because they like children and their peers, and enjoyed freedom in hours of work. Altruistic motives were important as well, though these had less influence than steady employment. More women than men returned to the classroom because they liked to teach.

TABLE VII
REASONS FOR RETURNING TO TEACH:
RETURNED-TEACHERS

Reason	Weighted total	
	Men	Women
A permanent teacher's certificate is valuable to a man, who can leave teaching and always return as a sure means of earning a living . . . . the same holds true for a woman	88	29
Teaching offers security	87	28
I like children and young people	54	26
I feel I do good to other people as a teacher	47	27
I like the teachers I know	44	21
The holidays appeal to me	42	24
I like the hours	38	18
The salary satisfies me	37	15
Pensions and sick benefits seem satisfactory	30	8
I believe teaching has prestige	29	17
I like to teach. The work has an absorbing appeal for me	24	16
I teach because I cannot do heavy physical labor	12	0

Ex-teachers

Table VIII shows definitely that the 33 men and the seven women interviewed did not leave the profession for the same reasons. The influences given by the men are again ranked. Salaries were not only twice as important as any other reason, but the weighted totals of salary, the lack of highly paid top positions, and slow promotions are the only reasons which carry a significant weighted total. These aggregate 165 for the men, and proportionately for the women, 35. Women left mainly because living conditions in the country did not suit them, large classes were a burden, and the social life was restricted. A young women related:

> I came to Alberta from Saskatchewan. I was experienced and judged to be capable. I hired by 'phone. The superintendent said he'd put me in a

close-in school, but I found it far-out. The roads were terrible. The superintendent came first in October. He was plastered, and had left his car in a mud-hole. He was the first man I'd seen wearing a tie since Labor Day. There was only one place to board. The husband and wife never spoke. They didn't seem to dislike each other, but they did dislike talking. The district was divided in religion. Neither side believed it was right to enjoy yourself. It was a quiet year for everybody. I had to get out in June.

The heavy teaching load caused this response:

You can't do justice to 25 kids in a country school with all grades. I tried a town school next, one grade with 45. I nearly went crazy. At University they taught us to be on the playground with enthusiasm. The other teachers resented me being better liked for this. There were a lot of chores to do. We had good staff meetings, but I saw how poorly I was doing in testing, in teaching, and almost nothing in community work, and no social life at all. I gave up.

TABLE VIII

REASONS FOR LEAVING TEACHING: EX-TEACHERS

Reason	Weighted total	
	Men	Women
Salaries for teachers were too low	100	3
There were not many highly paid "top" positions	44	2
Promotions were slow in teaching	21	1
Classes were too large to allow a teacher to do good work	14	17
Teaching did not have prestige	13	2
Pensions were low after long service	12	1
Teaching was too monotonus for me	12	6
I could not prove my efficiency as a teacher	11	6
Pupils' parents criticized teachers too much	9	8
Living conditions in the country did not suit me	9	16
Personal freedom was often restricted on hours for leisure, friends, types of amusement, place to live, joining certain groups pressure to overload me with community chores that would not ordinarily be carried by on person	6	7
Teaching was too hard work	6	7
A few children were rude and I did not like this	4	5
A large percentage of teachers never marry	0	12

Another teacher stressed ethics: "A few incompetent teachers gave the rest a bad name, and the weak teacher is not disciplined by the strong ones on most staffs." Still another said: "I did not want to be hard up always. Experienced teachers with degrees and getting more were always short of money, and of time to play with their kids." One man, judged by his peers to be able, explained:

> I left with genuine regret. I had two and a half years of Varsity, but felt I would need to invest another $3,000. and spend little time with my family for about four years. I doubled my salary when I started in business, and it is now twice what the highest paid principals receive.

Conclusions

Part II of this report shows that the teacher-group feels secure and happy in teaching, but they are not satisfied with the pay, pensions and prestige. The men in the returned-teacher group claim that monetary considerations and the subjective aspects of teaching influenced most men to leave. The women left because of the monotony of the classroom, large classes and substandard life in the country. This group returned to teach mainly because business did not offer what they had expected, while teaching assured a steady income, young people to help, and congenial colleagues. In the ex-teacher group the men left mainly because they felt that each community did not think enough of their services to pay what they later found they could earn in business.

The local people could have alleviated some of the annoying conditions not related to money. Their decision caused the profession to lose eleven men with one or more university degrees and successful experience as teachers and principals. The women in the ex-teacher group decided that living conditions in the country were not pleasant and that large classes were frustrating.

Proposals

Two writers[13] in the United States urge: (1) non-professional and sub-professional assistants for teachers, (2) professional assistants and internes, (3) more economical use of audio-visual aids, (4) delegation to the community of some areas now covered in school, (5) more dignity in the teaching profession, (6) parental recognition of the good services teachers give, and (7) improved public relations.

The swelling enrolments in schools must have teachers. One extreme plan is to lower standards for teaching and pupil performance, and to have large classes. This plan will fail as it has since Lancaster and Bell devised their scheme in the last century. Another extreme plan is to invest money and imagination to meet the

[13]W. H. Conley, "Creative Look at the Teacher Shortage," **The American School Board Journal** (April, 1955), p. 60; and R. C. Woellner, "Our Contributions to Overcoming Teacher Shortages," **The School Review** (September, 1954), p. 317.

crisis in Canadian education. Money and imagination have never been invested at the same time in Canada on a scale large enough to shown parents and business men what quality can be worth in education. The teacher shortage must be met if Canadian children are to have an education appropriate to Canada's resources today and her responsibilities tomorrow.

BIBLIOGRAPHY

Aikenhead, J. D. *To Teach, or Not To Teach.* Ed.D. Dissertation, University of Oregon, 1954.

The Alberta Home and School Association. *Facts About Education's Number One Problem* (Special Conference Report). The Association, Calgary, 134 - 8th Ave. East, December 3, 1955.

Clarke, S. C. T. and Pilkington, W. "Why Teaching is Chosen as a Career." *The Alberta Journal of Educational Research* 1:1 (March, 1955), pp. 44-52.

Conley, W. H. "Creative Look at the Teacher Shortage." *American School Board Journal* 130:60 (April, 1955), p. 60.

Melsness, H. C. "More Information, Please." *The Alberta School Trustee* XIII:6 (May, 1953), pp. 8-9.

Murray, Thomas H. "An Investigation into the Annoyances and Frustrations Which Cause Alberta Teachers to Quit Teaching." *The Alberta Journal of Educational Research* 1:3 (September, 1955), pp. 17-33.

The National Conference of Canadian Universities. *Proceedings.* The University of Toronto, 1955.

Page, Garnet, T. "Science and Mathematics Teaching in Our Secondary Schools." *Chemistry in Canada* VIII:3 (March, 1956), pp. 35-37.

Page, Garnet T. "Education and Professional Manpower in the U.S.S.R." *Chemistry in Canada* VIII:3 (May, 1956), pp. 35-39.

Rivers, F. S. and Jackson, R. W. B. "Teacher Supply in Canada." *Canadian Education* VIII:3 (June, 1953), pp. 3-21.

Sheffield, E. F. *Canadian University and College Enrolment Projected to 1956.* Ottawa, Dominion Bureau of Statistics, 1955.

Stinnet, T. M. "The Teacher Supply." *The School Executive* 74:1 (January, 1955), p. 69.

"Teacher Supply and Demand Report." *Journal of Teacher Education* VI:1 (March, 1955), pp. 23-71.

Woellner, R. C. "Our Contributions to Overcoming Teacher Shortages." *The School Review* 62 (September, 1954), pp. 315-319.

Yearbook of Education, London, Evans Bros., 1953.

AN EVALUATION OF THE EFFECTIVENESS OF A STANDARDIZED TEST OF LANGUAGE

C. H. Sangster
Supervisor of Elementary Instruction
Medicine Hat

The Problem

In an analysis of the strengths and weaknesses of an individual or groups of individuals, the effectiveness of measurement depends primarily on the reliability and validity of the instrument employed. When a test is to serve as a diagnostic instrument as well as a test of general achievement, it must yield component as well as total scores, each of which must be reliable and valid.

Test reliability and validity depend not only upon the content in general, but also upon the reliability and validity of the individual test items. No amount of statistical work can make up for weak items.

In selecting items for a test a number of considerations must be taken into account. One of these is the level of difficulty. What constitutes the optimum level of item difficulty in an achievement test has not been agreed upon among test authors. Some prefer approximately equal numbers of items at all levels of difficulty; others prefer to use a few easy and a few difficult items with the majority near the 50 per cent level of difficulty. There appears to be general agreement, however, that "the average difficulty of all items should be about 50 per cent."[1]

Another factor is the discriminating power of the test item. An item is said to have maximum discriminating power if every pupil who responds correctly ranks higher in achievement than any pupil who fails on the item. An item has zero discriminating power when there is no difference in achievement of students who succeed on an item and those who fail.

Statistical techniques for expressing the discrimination index of an item provide a measure of the relationship between success on the item and an independent criterion or the total score. A low index may be the result of technical weaknesses in the composition of a test item. Ambiguities, irrelevent clues and "catch" questions may make items ineffective. Low indices may also indicate that the "items are measuring rather specific points and are not highly

[1]H. E. Hawkes and others, **The Construction and Use of Achievement Examinations**, p. 32.

correlated."[2] If the area being tested includes a type of achievement that is not highly related to other achievements within the same area, then items testing for that type of achievement would not be expected to yield high discrimination indices.

This immediately establishes a fundamental difference in the content of general achievement and diagnostic tests. A general achievement test is one designed to express in terms of a single score a pupil's achievement relative to others in a class. The meaningfulness of a single score as a measure of general achievement depends upon the homogeneity of the field being tested. If low negative correlations exist between specific types of achievement, then no single measure can adequately describe a pupil's achievement in all these types simultaneously. Since the significance of a single score in a general achievement test depends upon the discriminating power of its items, it is desirable that their selection be restricted to those which correlate most highly with the total score so that a maximum in test homogeneity is achieved.

In a diagnosic test, items are selected to provide unitary subtests which measure independent areas of difficulty throughout the subject in question. Correlations between items and the total score, under such conditions, are frequently low or negative. Consequently, composite or total scores have little or no meaning.

It is not possible to have it both ways. The high correlation between items and total score, which makes for good measurement of general achievement, interferes with effective diagnosis. Likewise, the lack of correlation between component scores in diagnostic tests weakens effective measurement of general achievement.

Related Studies

As the reliability and validity of a test depend upon the characteristics of the items, it follows that a test may be improved through the selection, substitution or revision of its items. With the growing refinement of test construction, the use of item analysis to improve test efficiency has received increasing attention.

A study conducted by John E. Anderson[3] illustrates the bearing of item analysis upon the discriminative power of an English achievement test.

Following the administration and marking of an English examination, the discriminative power of each item was determined. Of a total of 222 items, eighty-six were selected as "good," eighty-three as "poor," and fifty-three items were found neutral. The tests were

[2]Fredrick B. Davis, **Item-Analysis Data**, p. 3.

[3]John E. Anderson, "The Effect of Item Analysis upon the Discriminative Power of an Examination," **Journal of Applied Psychology** (Vol. 19), pp. 237-244.

rescored to obtain the total score for each pupil on the good and the poor items. An analysis of the scores produced the following results.

1. The scores from the good items correlated .95 with the total test score.
2. The scores from the poor items correlated .45 with the total test score.
3. The correlation between scores on the good and poor items was .21.

Anderson says "the fact that the reduced examination composed of good items, constituting approximately one-third of the total number of questions, correlates .95 with the total examination score, shows that the good items alone are almost as valuable as the total examination."[4]

To assess the validity of the full test, of the good items and of the poor items, scores were correlated with final English grades, gradings on three book reports, and scores on an Iowa English test. Coefficients of reliability were computed by the split-half method.

Anderson concludes as follows:

1. The score on the good items predicts the total test score with high accuracy and predicts the final grade in English, book report grades and the Iowa English score better than does the total test.
2. Item analysis resulted in the production of a good item test which had almost as great reliability as the total test and which, if it had possessed the same number of items, would have had noticeably greater reliability.

A similar study was conducted by C. H. Lawshe, Jr. and James S. Mayer[5] in which they compared two methods of item analysis to determine which produced the more reliable test. They also compared the reliability coefficients of a short test composed of good items with that of a longer test composed of good and poor items.

Two indices of discrimination were determined for each of 300 items by the correlation method devised by Flanagan and by the D-value method based on Lawshe's nomograph. The best 20, 40, 60 and 100 items were selected from the original 300 by the use of the two item analysis methods.

The reliabilities of the tests were computed by the split-half method and the following comparisons were made.

1. In selecting forty and sixty items, the two methods produced tests with no difference in reliability.

[4]Ibid., p. 238.

[5]C. H. Lawshe and others, "The Effect of Two Methods of Item Validation on Test Reliability," Journal of Applied Psychology (Vol. 31), pp. 271-277.

2. The Flanagan method produced the more reliable test of twenty items and the D-value method yielded the more reliable test of one hundred items.
3. The difference between the reliability of the test produced by the Flanagan method and the original test was not significant. The D-value test was more reliable than the original 300 item test.

These two studies indicate that through the use of item analysis, it is frequently possible to shorten a test and at the same time to increase its reliability.

Research Design

The present study was designed primarily to determine the effectiveness of the California Language Test items as general achievement test items for selected groups of Alberta pupils in in grades IV and VII. The results of previous studies in this project have been reported by G. R. Conquest,[6] T. J. Reid[7] and Dr. H. T. Coutts and Dr. H. S. Baker.[8]

The study has been confined to an analysis of test results from a combined large urban and small urban sample. The grade IV sample contained 350 pupils (199 large urban and 151 small urban); while the grade VII contained 341 pupils (197 large urban and 144 small urban).

The tests used in the project were the California Language Test, Elementary, Form AA, for the grade IV sample and the California Language Test, Intermediate, Form AA, for the grade VII sample. These tests were developed jointly by Ernest W. Tiegs, Ph.D., and Willis W. Clark, Ed.D., and are published by the California Test Bureau—5916 Hollywood Boulevard, Los Angeles 28, California.

In determining the effectiveness of the California Language Test items as general achievement test items, two related factors were investigated: (a) the discriminating power of the test items, and (b) the difficulty of the items.

At present, a variety of item analysis procedures is being used in test construction. The statistics most frequently employed for the purpose are the critical ratio, the product-moment coefficient of correlation, and the biserial coefficient of correlation. The biserial correlation method is considered by many as being the most satis-

---

6G. R. Conquest, **A Survey of English Language Achievement in Grades Four and Seven in Selected Aberta Schools.**

7T. J. Reid, **A Survey of the Language Achievement of Alberta School Children in Relation to Bilingualism, Sex and Intelligence.**

8H. T. Coutts and H. S. Baker, "A Study of the Written Composition of a Representative Sample of Alberta Grade Four and Grade Seven Pupils," **Alberta Journal of Educational Research** (June, 1955), pp. 5-18.

factory measure of item validity or internal consistency. It measures the relationship "between each item and the total score, excluding the item in question".[9] This coefficient would probably find wider use if its computation were less labourious.

To approximate the biserial correlation coefficient, with less labour, a method was devised by T. L. Kelly[10] in which he demonstrated that the lowest and highest twenty-seven per cent of a sample are the most serviceable groups for use in item-analysis, even though the items are not all of fifty per cent difficulty.

In 1939, J. C. Flanagan,[11] using the method described by Kelley, devised a chart showing the values of product-moment coefficients corresponding to given proportions of successes in the upper and lower twenty-seven per cent of a sample. While the coefficients taken from Flanagan's chart are unaffected by item difficulty, they do not represent a linear function and therefore cannot be added, substracted or averaged.

To satisfy the requirement for an index of discrimination which is a linear function, Fredrick B. Davis prepared an item analysis chart containing discrimination indices derived from Flanagan's product-moment coefficients. Flanagan's coefficients, which range from —.93 to +.93, were transformed into Fisher's z's. Davis then multiplied the z values, which represent a linear function, by a constant to obtain item discrimination indices having a range from —100 to +100.

The Flanagan method and the Davis method, which require the same arrangement of data, were used for item analysis in this study.

To determine the general pattern of item difficulty and average level of difficulty of sub-tests, the percentage of successes for each item was computed.

Employing these methods, the writer examined the elementary and intermediate tests for ineffective items and determined how well the tests are adapted to the language abilities of Alberta grade IV and grade VII pupils.

Item-Analysis Data

The item-analysis techniques described by Davis and Flanagan require computation of the proportion of successes on items in the twenty-seven per cent of the sample scoring the highest on the criterion and the twenty-seven per cent scoring the lowest.

---

[9]Davis, **op. cit.**, p. 9.

[10]T. L. Kelley, "The Selection of Upper and Lower Groups for the Validation of Test Items," **Journal of Educational Psychology** (Vol. XXX), pp. 17-24.

[11]J. C. Flanagan, "General Considerations in the Selection of Test Items and a Short Method of Estimating The Product-Moment Coefficient from Data at the Tails of the Distribution," **Journal of Educational Psychology** (Vol. XXX), pp. 674-680.

The proportion of successes is defined as the number of testees that know the answer to an item divided by the number of testees that respond to the item. The reader's attention is drawn to the fact that the word "know" is used in the definiion rather than the word "mark". This distinction is desirable whenever multiple-choice items are used because a certain number of testees, without knowing the answer, will mark the correct one by chance. To make allowance for this fact, wherever possible, a correction for chance has been employed.

The scoring procedure in Sections A and B of both tests reduces the factor of chance by allowing credit for an item when a testee may select any number of the possible responses, provided that the correct response is included in the selection. It is possible, therefore, for a testee to receive a perfect score by simply filling-in all response spaces. No penalty is imposed for over-capitalization or over-punctuation.

In Section B, of both tests, a place is provided for the testees to indicate that no punctuation is necessary, but such is not the case in Section A—Capitalization. Here, no capitalization is indicated by no response to an item. This results in an ambiguity in the interpretation of responses. No response may indicate that the testee refrained from marking an answer because of lack of knowledge or a lack of time. Or it might be interpreted to mean that the testee, after reading the item, decided that no capitalization was needed.

In the computation of the proportion of successes on items of Section A and B, of both tests, no corrections for chance were made. The proportions of successes in the remaining sections were corrected for chance.

Following the computation of the proportion of successes, item analysis charts were used to determine the discrimination index for each item.

The item-analysis chart, devised by Davis, is arranged in such a way that the percentage of succeseses of the twenty-seven per cent of pupils scoring highest on the test is located on the horizontal axis. The percentage of successes of the lowest twenty-seven per cent is located on the verical axis. By reading horizontally and vertically from the previously determined percentages. two indices may be located simultaneously, one immediately above the other. The upper index is the discrimination index of an item and the lower, a difficulty index.

The Flanagan chart is constructed in a similar manner, with the proportions of successes of the highest twenty-seven per cent placed on the horizontal axis and the proportion of successes of the lowest

twenty-seven per cent on the vertical axis. Product-moment coefficients of correlation may be located in the same manner as are the Davis indices of discrimination. The coefficients are given in multiples of five with each of the same value and sign being joined by a line. A coefficient, other than one of a multiple of five, must be estimated by its location between two adjacent lines.

Table I contains item-analysis data based on the test results from the California Language Test, Elementary. The data in Table II are based on the results from the Intermediate test.

In both Table I and Table II, R refers to the number of pupils responding to the items, and P the proportion responding to the item correctly. Item 5, 14 and 28 in Table I and 6, 12, 13, 20 and 24 in Table II require two responses each. The data for these items are numbered 1 and 2 in each table.

It will be noted that, for a few items, the proportion of successes is negative after a correction for chance had been made.

> A negative proportion may be interpreted to mean that fewer testees marked the correct answer than would have been expectede by chance, probably because many of them were misinformed rather than simply uninformed with respect to the point being tested.[12]

Where the signs of the two proportions used to enter the item-analysis chart are different, there is no direct method of arriving at an accurate index of discrimination. Davis states that, in his experience, serviceable indices can be obtained for items when the proportion of successes in the lowest twenty-seven per cent of the sample is negative by altering the proportion arbitrarily to the proportion that would result from one-half a testee having answered the item correctly.

In this study such a procedure was followed by entering the item-analysis chart at one per cent on the vertical scale when a negative proportion occurred. The discrimination index thus obtained is always an underestimate. This fact is noted in Tables I and II, by the addition of a plus superscript to the discrimination index, and Flanagan's "r".

Each item that correlates positively with the final score contributes to the final measurement, to some extent, regardless of how small the correlation might be. The higher the correlation the more efficient is the item for general achievement test purposes.

Items which exhibit either zero or negative correlations with the total score do not contribute to the final measurement and therefore have no value as general achievement test items.

---

[12]Davis, op. cit., p. 3.

TABLE I

ITEM-ANALYSIS DATA FROM THE CALIFORNIA LANGUAGE TEST (ELEMENTARY)

Item No.	Highest 27%		Lowest 27%		Davis Discrim. Index	Flanagan r
	R	P	R	P		
A. Capitalization						
1	92	.98	87	.93	21	.35
2	89	.95	65	.69	28	.43
3	81	.86	72	.77	8	.13
4	90	.96	56	.60	37	.54
5—1	93	.99	75	.81	35	.52
2	88	.94	67	.72	24	.37
6	73	.78	43	.46	21	.34
7	93	.99	74	.80	36	.55
8	90	.95	58	.64	34	.51
9	90	.95	58	.64	34	.51
10	92	.98	66	.73	35	.52
11	84	.89	67	.71	17	.27
12	71	.76	36	.41	23	.36
13	48	.51	20	.23	19	.31
14—1	82	.87	59	.67	17	.27
2	74	.79	31	.35	30	.45
15	85	.90	64	.73	17	.27
B. Punctuation						
16	83	.90	55	.59	24	.37
17	85	.89	56	.49	30	.45
18	72	.71	50	.41	19	.31
19	75	.79	39	.27	52	.70
20	54	.47	16	.17	22	.35
21	74	.74	39	.27	31	.46
22	87	.90	44	.47	33	.50
23	57	.51	19	.24	18	.29
24	89	.93	63	.62	29	.43
25	85	.89	44	.46	33	.50
26	84	.87	29	.18	52	.69
27	87	.89	54	.57	26	.40
28—1	61	.57	21	.08	39	.56
2	29	.30	5	.04	30	.46
29	81	.83	44	.45	27	.41
30	88	.89	46	.46	33	.50
C. Words and Sentences						
31	93	.98	78	.66	40	.59
32	94	1.00	85	.81	35	.52
33	93	.98	90	.91	17	.27
34	84	.79	84	.79	0	.00
35	94	1.00	91	.94	19	.31
36	93	.98	78	.66	40	.59
37	94	1.00	69	.47	57	.74
38	70	.49	42	—.11	55+	.71+
39	93	.98	89	.89	20	.32
40	93	.98	82	.74	34	.51
41	81	.72	67	.43	19	.32

TABLE I—*Continued*

Item No.	Highest 27%		Lowest 27%		Davis Discrim. Index	Flanagan r
	R	P	R	P		
42	90	.91	59	.26	49	.66
43	88	.87	53	.13	59	.72
44	85	.81	38	—.18	75+	.86+
45	87	.85	48	.04	67	.80
46	90	.91	69	.53	31	.46
47	93	.98	47	.04	76	.88
48	89	.89	72	.60	24	.38
49	85	.81	35	—.21	75+	.86+
50	64	.39	22	—.49	55+	.72+

The point at which a positively correlating item should be removed from a general achievement test cannot be stated with any finality. It depends upon the author's ability to produce another item which measures the same elements yet correlates more highly with the final score. As indicated in the study by Lawshe and Mayer,[13] reliability of measurement might be raised by removing seriously defective items or by adding items which exhibit high correlations with the total score.

Davis states:

> Items with discrimination indices above 20 will ordinarily be found to have sufficient discriminating power for use in most achievement and aptitude tests.[14]

Presumably, those with discrimination indices of less than twenty might be replaced as achievement test items. This constitutes the basis upon which items of the California Language Tests were judged in this study.

Based on the data summarized in Table I the following conclusions appear to be justified.

(1) Item 34 with a discrimination index of zero, should be removed from the test. This item fails to discriminate between levels of ability of testees in the groups of large urban and small urban Alberta grade IV pupils.

(2) Items 3, 11, 13, 14 (1), 15, 18, 23, 33, 35, 39 and 41, should be replaced, if possible. These items have discrimination indices of 20 or less.

(3) Items 37, 38, 43, 44, 47, 49 and 50 have the highest discrimination indices in the test. These items have indices of 55 or more.

[18]Lawshe and Mayer, op. cit., p. 277.

(4) Of a total of fifty-three items in the California Language Test, Elementary, twelve, or twenty-three per cent, fail to meet the requirements as suggested by Davis.

Table II contains the item-analysis data derived from the test results of the grade VII sample on the California Language Test, Intermediate.

TABLE II

ITEM-ANALYSIS DATA FROM THE CALIFORNIA LANGUAGE TEST (INTERMEDIATE)

Item No.	Highest 27%		Lowest 27%		Davis Discrim. Index	Flanagan r
	R	P	R	P		
A. Capitalization						
1	91	.99	84	.91	23	.37
2	92	1.00	72	.78	37	.57
3	84	.91	43	.47	35	.53
4	91	.99	87	.95	16	.25
5	92	1.00	77	.84	32	.48
6—1	88	.96	76	.78	24	.39
2	89	.97	76	.83	21	.34
7	88	.96	54	.59	37	.56
8	88	.96	77	.84	19	.31
9	88	.96	55	.60	37	.55
10	92	1.00	85	.92	22	.35
11	91	.99	69	.75	40	.58
12—1	92	1.00	73	.79	36	.54
2	92	1.00	76	.83	33	.50
13—1	83	.90	85	.92	— 3	—.05
2	89	.97	67	.82	24	.39
14	73	.79	54	.59	14	.23
15	67	.82	36	.39	29	.45
B. Punctuation						
16	71	.72	70	.74	— 1	—.02
17	91	.99	73	.79	36	.54
18	83	.90	58	.58	26	.41
19	70	.70	45	.40	19	.31
20—1	72	.73	46	.41	20	.32
2	66	.65	28	.16	34	.51
21	84	.90	62	.64	23	.37
22	87	.94	62	.64	29	.43
23	80	.79	47	.42	25	.39
24—1	75	.77	43	.38	27	.41
2	60	.57	22	.07	42	.60
25	87	.93	65	.72	22	.35
26	86	.92	59	.63	26	.41
27	89	.96	61	.66	32	.48
28	92	1.00	73	.86	30	.45
29	49	.42	24	.12	24	.38
30	90	.97	70	.86	19	.31
31	82	.89	59	.70	17	.27
32	64	.64	56	.64	0	.00
33	35	.26	11	—.06	41+	.59+

TABLE II—*Continued*

Item No.	Highest 27%		Lowest 27%		Davis Discrim. Index	Flanagan r
	R	P	R	P		
34	74	.85	52	.69	15	.23
35	81	.95	57	.77	21	.34
C. Words and Sentences						
36	92	1.00	83	.80	36	.54
37	86	.87	77	.67	17	.27
38	90	.96	81	.76	25	.40
39	89	.93	71	.54	34	.51
40	85	.85	57	.24	43	.61
41	91	.98	86	.87	22	.35
42	86	.87	72	.57	23	.37
43	69	.50	46	.00	55	.73
44	76	.65	57	.24	27	.41
45	92	1.00	86	.87	29	.45
46	91	.98	69	.50	50	.68
47	92	1.00	73	.59	50	.68
48	92	1.00	84	.90	25	.40
49	91	.98	75	.69	37	.55
50	92	1.00	77	.73	42	.60
51	92	1.00	77	.75	40	.58
52	91	.98	75	.70	37	.55
53	86	.87	51	.16	51	.69
54	88	.91	67	.52	32	.48
55	78	.70	33	—.25	68+	.81+
D. Parts of Speech						
56	87	.93	44	.35	46	.64
57	90	.97	55	.50	46	.64
58	81	.85	25	.09	57	.74
59	43	.33	16	—.03	46+	.64+
60	87	.93	60	.57	32	.48
61	34	.21	20	.02	30	.46
62	72	.73	12	—.09	69+	.81+
63	88	.95	34	.22	58	.75
64	82	.86	39	.29	40	.58
65	85	.90	36	.25	48	.66
66	57	.52	22	.05	41	.59
67	88	.95	28	.13	66	.80
68	89	.96	61	.59	37	.55
69	89	.96	41	.32	54	.72
70	92	1.00	59	.58	51	.69
71	8	—.14	7	—.15	0	.00
72	81	.86	29	.16	50	.68
73	79	.84	26	.12	52	.70
74	45	.37	20	.03	38	.56
75	89	.97	54	.49	47	.64

The following conclusions are based on the data presented in Table II and have reference to Alberta grade VII pupils of large urban and small urban areas.

(1) Items 13 (1) and 16 discriminate negatively and therefore are of no value as general achievement test items.

(2) Items 32 and 71, with discrimination indices of zero, fail to discriminate between grade seven Alberta pupils of high and low levels of ability and should be removed from the test.

(3) Items 4, 8, 14, 19, 20 (1), 30, 34 and 37 have discrimination indices of 20 or less. According to the suggestion of Davis, these should be replaced by items which have higher discriminating power.

(4) Items 43, 58, 62, 63 and 67 have the highest discrimination indices in the test. Their indices are 55 or more.

(5) Of the eighty items in the intermediate test, thirteen, or sixteen per cent, fail to meet the requirements of achievement test items as proposed by F. B. Davis.

Data on Item Difficulty

If the only discrimination indices used in selecting items for a test are based on the total score, it is desirable that items having the highest indices be chosen. But if maximum efficiency of measurement is to be attained the requirements of distribution and pattern of item difficulty must also be taken into account.

Items measuring ability at one level with high discriminating power, may have very low discriminating power at a different level. The fact is well known that the discriminating power of an item is greatest when it is used in a sample in which fifty per cent of the testees respond to the item correctly.

In the construction of achievement tests, where maximum discrimination among all testees is desired, the optimum shape of the distribution becomes a function of the intercorrelations of the items.

The fact that the average discrimination index for all items is low in both tests may be due to the fact that the items are measuring rather specific elements that are not highly intercorrelated. Therefore, it might be expected that the items would be distributed over a wide range of difficulty with the majority near the fifty per cent level of difficulty.

In this study, the percentage of successes is used as an index of item difficulty. It is the percentage of pupils in the sample who responded correctly to a test item. The percentage of pupils responding successfully, unsuccessfully and making no response are

summarized in Tables III and IV. The letter S refers to the percentage of pupils responding correctly, U refers to the percentage responding incorrectly and N refers to the percentage making no response.

TABLE III

PERCENTAGE OF SUCCESSES AND FAILURES ON ITEMS OF THE CALIFORNIA LANGUAGE TESTS, ELEMENTARY

Item No.	S	U	N
A. Capitalization			
1	94	6	0
2	86	14	0
3	69	31	0
4	88	12	0
5—1	89	11	0
2	86	14	0
6	74	26	0
7	93	7	0
8	74	26	0
9	78	22	0
10	88	12	0
11	87	13	0
12	63	34	3
13	45	51	4
14—1	72	24	4
2	50	46	4
15	77	19	4
Mean % of Success = 77			
B. Punctuation			
16	68	32	0
17	71	28	1
18	53	43	4
19	60	39	1
20	68	31	1
21	55	45	0
22	70	28	2
23	66	33	1
24	76	24	0
25	72	26	2
26	54	40	6
27	64	24	12
28—1	36	33	31
2	12	59	29
29	63	27	10
30	59	28	13
Mean % Success = 56			
C. Words and Sentences			
31	90	10	0
32	98	2	0
33	99	1	0
34	89	11	0
35	98	2	0
36	89	11	0
37	84	16	0
38	64	36	0
39	99	1	0
40	97	3	0
41	84	16	0
42	87	13	0
43	79	21	0
44	61	39	0
45	82	18	0
46	95	5	0
47	88	11	1
48	91	8	1
49	66	33	1
50	43	53	4
Mean % Success = 84			

Mean Percentage of Success = 74
(all items)

An examination of Table III reveals the following:

(1) The range of difficulty of the items is satisfactory but the test contains too many relatively easy items. With a mean percentage of success of 74, it contains too many items at the lower levels of difficulty and too few near the 50 per cent level.

(2) The punctuation test, with a mean percentage of successes of 56, provides the best distribution of item difficulty of the three sub-tests. However, it contains too few items at the lower levels of difficulty.

(3) Discriminations between levels of ability in the A and C sub-tests are likely to be less than optimal because of the low range of the item difficulty, and because of concentration of items at the lower levels of difficulty.

Table IV summarizes the percentages of pupils responding successfully, unsuccessfully and making no response to the eighty items of the California Language Test, Intermediate.

An examination of the levels of item difficulty in Table IV indicates that there is an adequate range but that the test, like the elementary, contains too many relatively easy items. The mean percentage of success for the test is 77.

The capitalization, and words and sentences sub-tests, each with a mean percentage of success of 86, have very similar distributions of item difficulty. Both sub-tests contain too many relatively easy items and have insufficient range of item difficulty for the sample of pupils used in this study.

The punctuation test, with a mean percentage of success of 78, contains too many items at the lower level of difficulty and too few near the 50 per cent difficulty.

Of the four sub-tests, the parts of speech test contains items covering the widest range of difficulty. There are, however, too many items at the lower levels.

Both the elementary and intermediate tests were used on samples of the lowest grades for which they were designed. The elementary test, intended for grades IV, V and VI, was administered to a grade IV sample, while the intermediate test, intended for grades VII, VIII and IX, was administered to a grade VII group.

Since the tests contain an unduly large number of relatively easy items for grade IV and grade VII pupils, it might be expected that the distributions of item difficulty would be still more seriously skewed if the tests were employed at their upper grade levels. This would result in less effective measurement of general achievement when the tests are administered to grades VI and IX pupils.

The current practice in test construction is to present items covering a wide range of difficulty, arranged in ascending order of difficulty from the very easy to the most difficult. This makes it possible for the less able pupil to respond to items within his level of ability without being discouraged early in the test by items of

TABLE IV

PERCENTAGE OF SUCCESSES AND FAILURES ON ITEMS OF THE CALIFORNIA LANGUAGE TEST, INTERMEDIATE

Item No.	S	U	N
A. Capitalization			
1	96	4	0
2	90	10	0
3	69	31	0
4	97	3	0
5	94	6	0
6—1	91	9	0
2	91	9	0
7	79	21	0
8	92	7	1
9	80	20	0
10	98	1	1
11	89	10	1
12—1	93	6	1
2	93	7	0
13—1	85	14	1
2	89	10	1
14	71	27	2
15	55	42	3
Mean % Success =86			
B. Punctuation			
16	74	26	0
17	94	6	0
18	85	15	0
19	64	35	1
20—1	72	28	0
2	48	50	2
21	81	18	1
22	79	19	2
23	72	26	2
24—1	69	29	2
2	46	52	2
25	86	11	3
26	82	15	3
27	86	11	3
28	91	5	4
29	37	59	4
30	90	5	5
31	81	12	7
32	60	31	9
33	20	69	11
34	69	16	15
35	79	6	15
Mean % Success = 78			

Item No.	S	U	N
C. Words and Sentences			
36	93	7	0
37	88	12	0
38	94	6	0
39	88	12	0
40	76	24	0
41	97	3	0
42	84	16	0
43	60	40	0
44	72	28	0
45	98	2	0
46	89	11	0
47	91	9	0
48	97	2	1
49	92	7	1
50	93	6	1
51	95	4	1
52	93	6	1
53	73	26	1
54	89	10	1
55	59	40	1
Mean% Success = 86			
D. Parts of Speech			
56	73	27	0
57	86	14	0
58	60	40	0
59	34	66	0
60	85	15	0
61	29	71	0
62	43	57	0
63	70	30	0
64	69	30	1
65	73	26	1
66	41	59	0
67	64	36	0
68	86	14	0
69	77	22	1
70	85	14	1
71	10	89	1
72	67	32	1
73	60	39	1
74	31	68	1
75	82	17	1
Mean % Success = 61			

Mean Percentage of Success = 77
(all items)

prohibitive difficulty. The most difficult items, at the end of the test, differentiate between pupils of superior ability.

Where an achievement test contains a number of sub-tests, an arrangement of items in ascending order of difficulty might be expected in each sub-test. They should begin with their easiest items and end with the most difficult.

An inspection of Table III reveals a tendency toward an increase in item difficulty in the sub-tests of the elementary test. This pattern of item difficulty is only slightly apparent from the test results of the sample employed in this study. The large proportion of items of approximately the same difficulty causes the pattern of item difficulty to be barely discernible.

A similar pattern of item difficulty in the intermediate test is somewhat apparent in only the capitalization, and words and sentences sub-tests. In the punctuation, and parts of speech tests, items are arranged in an irregular fashion with respect to item difficulty.

Items in the sub-tests of the elementary and intermediate tests may have been arranged in ascending order of difficulty for the normalizing sample but evidence of this arrangement for the sample in this study is minimal.

Conclusions

(1) Defects in the scoring procedure and in the method of recording answers in the capitalization and punctuation sections reduces the effectiveness of the test items. Equal credit is given to pupils marking only the correct response, and to others marking several, of which one is correct. There would appear to be a difference in the ability of these pupils but this is not always indicated by the final score.

(2) In both tests, the Davis discrimination indices are relatively low, indicating a lack of test homogeneity. As a result, some ambiguity in the interpretation of the total score may be expected.

The fact that items appear to be measuring specific elements which are not highly correlated may account for the lack of internal consistency in the test.

Because of their restricted content, the sub-tests may possess greater test homogeneity and yield relatively unambiguous scores. But before one places any credence in their results he should be assured of their reliability. The test authors of the California Language Tests have not provided this information.

(3) Perhaps the greatest factor limiting the effectiveness of the California Language Tests is the unduly large proportion of re-

latively easy items. The levels of item difficulty are not well adjusted to the abilities of Alberta grade IV and grade VII pupils in large urban and small urban centres. The large proportion of relatively easy items has the effect of reducing the power of the test to differentiate between pupils at the upper levels of ability.

Since the tests contain too many relatively easy items for the sample of grade IV and VII pupils, it might be expected that the distributions of item difficulty would be still more seriously skewed if the tests were administered to grades six and nine pupils.

(4) The California Language Tests are limited in their usefulness in that they measure but a few of the basic objectives of language instruction. Their content is restricted to the measurement of the use of capital letters and punctuation marks, and the recognition of complete sentences and parts of speech. No attempt is made to measure some of the broader outcomes such as the ability to organize and present material logically, to sustain an idea, to establish continuity of thought and to discriminate in the selection of words. For this reason they must be regarded as tests of language usage rather than comprehensive tests of language ability. This is a weakness which is common to the language portion of most of the current achievement tests.

BIBLIOGRAPHY

Anderson, John E. "The Effect of Item Analysis upon the Discriminative Power of an Examination," *Journal of Applied Psychology* 19 (1935), pp. 237-244.

Conquest, George R. *A Survey of Language Achievement in Grades IV and VII in Selected Alberta Schools.* Unpublished Master's Thesis, University of Alberta, 1954.

Coutts, H. T. and Baker, H. S. "A Study of the Written Composition of a Representative Sample of Alberta Grade IV and Grade VII Pupils." *Alberta Journal of Educational Research* 1:2 (June, 1955), pp. 5-18.

Davis, Frederick B. *Item-Analysis Data.* Cambridge, Mass., Harvard University, 1946.

Flanagan, John C. "General Considerations in the Selection of Test Items and a Short Method of Estimating the Product-Moment Coefficient from Data at the Tails of the Distribution." *Journal of Educational Psychology* XXX (1939), pp. 674-680.

Hawkes, H. E., Lindquist, E. F. and Mann, C. R. *The Construction and Use of Achievement Examinations.* Boston, Houghton Mifflin Company, 1936.

Kelley, T. L. "The Selection of Upper and Lower Groups for the Validation of Test Items." *Journal of Educational Psychology,* XXX (1939), pp. 17-24.

Lawshe, C. H. and Mayer, James S. "The Effect of Two Methods of Item Validation on Test Reliability." *Journal of Applied Psychology* 31 (1947), pp. 271-277.

Reid, T. J. *A Survey of the Language Achievement of Alberta School Children in Relation to Bilingualism, Sex and Intelligence.* Unpublished Master's Thesis, University of Alberta, 1954.

The Alberta Journal of Educational Research

Vol. II.

1956

THE COMMITTEE ON EDUCATIONAL RESEARCH

Faculty of Education
University of Alberta

ACKNOWLEDGMENT

●

This publication was made possible by funds granted by Carnegie Corporation of New York. That Corporation is not, however, the author, owner, publisher, or proprietor of this publication, and is not to be understood as approving by virture of its grant any of the statements made or views expressed therein.

Editorial

The concern of all of us about the lengthening of school days for most children—Education Eating Up Life, Stephen Leacock called it—may be lightened somewhat by the conclusions reached by Beaton in her study of acceleration. Measures designed to abbreviate the period from school entrance to matriculation have had to break, somehow, the shackles of the grade system. Miss Beaton's study does not concern itself, however, with the means of acceleration but only with the consequences. These seem favorable to a wider adoption of acceleration practices.

Meredith's study is one of group action, or in more formidable terms, of group dynamics, applied to the prosaic business of curriculum construction and revision. If a tedious, and usually a distasteful, task can be made pleasant, entertaining, and educationally beneficial to everyone implicated in it, all sitting and prospective committee members will hail Mr. Meredith. In a committee-conscious age this includes most of us.

The Jardine study is partly historical and the Buckles study exclusively so. The one relates to science in the high school and the other to mathematics. Without historical perspective man is blind. Now, no longer need appraisors, critics, protagonists, curriculum makers and revisors suffer from historical blindess in these two fields. We are happy to present these studies.

Dr. Dunlop contributes a brief survey of educational research in Scotland. This will be followed at a later date by a similar review of research in England, and possibly by something similar for Australia. These will be valuable for comparative purposes, and especially valuable to students in education.

Since the inception of this Journal in March, 1955, Dr. Harold S. Baker has looked after its destinies. Seven numbers have appeared, each a tribute to his editorial skill. In an early editorial (Vol. I. No. 2) he confessed, "Mistakes have been made, and there will no doubt be more of them." In point of fact mistakes have been few, and readers will agree that a high level of excellence has been maintained. As the first editor-in-chief Dr. Baker established patterns of style, of format, footnotes and biographic usages, and of course of editorial policy in its entirety.

Fresh administrative duties now make it desirable that Dr. Baker be relieved of his editorial responsibilities. The Journal owes him a heavy debt of gratitude.

THE EFFECTS OF ACCELERATION ON THE ACADEMIC PROGRESS AND ON THE PERSONAL AND SOCIAL DEVELOPMENT OF EDMONTON AND CALGARY GRADE X STUDENTS

MARY A. BEATON
Western Canada High School
Calgary, Alberta

A study of "Promotion Practices and Policies in Alberta Schools," reported by Clarke,[1] showed that during the school term 1953-54, only 0.42 per cent of a total of 80,649 students in grades one to eight in Alberta schools was accelerated. At the end of the year, the percentage of students who were to be failed was 5.4.

If the lower limit of selection is set at an intelligence quotient of 120, approximately 7 per cent of the school population is mentally superior. Should this group be accelerated?

The answer to this question depends in part on what has happened to those pupils who have been advanced more rapidly than usual. Has acceleration interfered with their scholastic achievement? Have they developed in a satisfactory way socially and personally?

Terman and Oden[2] advocate that students having intelligence quotients above 135, should be accelerated one or two years. Witty,[3] Trusler,[4] Pressey,[5] and Worcester,[6] favor the moderate use of acceleration for children of above average ability. Justman[7] found that the academic progress of intellectually gifted senior high school students who had been accelerated was just as satisfactory as that of non-accelerated students of comparable ability.

The present study was an attempt to compare the academic achievement of accelerated Edmonton and Calgary students with that of non-accelerated students. Furthermore, answers to the following questions were sought: Would the self-ratings of personal and social adjustment by accelerated students be similar to those

---

1S. C. T. Clarke, "Promotion Practices and Policies in Alberta Schools," **Alberta Journal of Educational Research,** (December, 1955) pp. 24-34.

2Paul Witty, editor, **The Gifted Child,** p. 43.

3Paul Witty, "Education for the Talented and for Leadership," **Teachers' College Record,** (February, 1956), pp. 298-299.

4J. W. Trusler, "Pupil Acceleration in the Elementary School," **Grade Teacher,** (October, 1949), pp. 16-17, 96-98.

5S. L. Pressey, **Educational Acceleration: Appraisals and Basic Problems.** Bureau of Educational Research Monographs No. 31.

6D. A. Worcester, **The Education of Children of Above Average Ability.**

7J. Justman, "Academic Achievement of Intellectually Gifted Accelerants in Senior High School," **School Review,** (November, 1954), pp. 469-473.

made by students who had completed one grade each year? Would the teachers of accelerated students rate them as highly as other students on a scale of personal and social traits? Were accelerated students as active socially as others? Were they chosen as frequently to play on athletic teams? Were they leaders as often as were non-accelerated students? Were accelerated students in favor of rapid promotions?

Procedure

A promotion questionnaire was given to all Edmonton and Calgary Grade X classes in order to identify the accelerated students. Of the 2,618 students who completed the promotion questionnaire, 119 were included in the final accelerated group. A student was classified as having been accelerated if he had entered Grade I before the age of five and one-half years, or if he had entered Grade I before the age of six and one-half years and later had skipped a grade, or if he had entered Grade I before the age of six and one-half years and later had completed two grades in one year. A student from any of the three above categories who later failed was included. Any pupil who failed and who later was accelerated was omitted.

Each accelerated student was matched with a control student according to sex and school attended during the current year. With thirteen execptions, the accelerated students were taking the same scholastic course as their corresponding control students. The Terman-McNemar Test of Mental Ability was administered to both the accelerated and control students. The two groups were equated satisfactorily with respect to mean intelligence quotients.

Table I presents the distribution of Terman-McNemar intelligence quotients for the accelerated students. The mean intelligence quotient for the total accelerated group was 122.1 with a standard deviation of 11.1 whereas the mean intelligence quotient for the control group was 122.1 with a standard deviation of 9.6. The distribution of Terman-McNemar intelligence quotients for the control group is given in Table II.

The accelerated students were divided into two groups, the superior accelerated students having intelligence quotients of 120 or over and the normal accelerated students having intelligence quotients below 120. Table III shows that both groups were equated satisfactorily with control groups with respect to mean intelligence scores.

There was of necessity a difference in mean age between the accelerated and control students. The mean age for the total group of accelerated students was fourteen years and nine months. The mean age for the complete control group was fifteen years and five

months. The distributions according to age for the four groups are given in Tables IV and V. The greatest difference in age was found between the superior accelerated group and the superior control group. The difference in mean age for these groups was nine months. A difference of six months was found between the mean age of the normal accelerated students and the normal control students.

TABLE I

DISTRIBUTION OF TERMAN-McNEMAR INTELLIGENCE QUOTIENTS FOR ACCELERATED STUDENTS

Terman-McNemar I.Q.	Boys	Girls	Boys and Girls
150-154	.....	1	1
145-149	1	1	2
140-144	.....	5	5
135-139	6	2	8
130-134	9	5	14
125-129	9	9	18
120-124	8	12	20
115-119	5	13	18
110-114	8	12	20
105-109	3	6	9
100-104	.....	2	2
95- 99	.....	1	1
90- 94	.....	1	1
N	49	70	119
Mean	124.0	120.7	122.1
S.D.	9.4	11.8	11.1

TABLE II

DISTRIBUTION OF TERMAN-McNEMAR INTELLIGENCE QUOTIENTS FOR CONTROL STUDENTS

Terman-McNemar I.Q.	Boys	Girls	Boys and Girls
140-144	3	3	6
135-139	6	2	8
130-134	3	5	8
125-129	12	15	27
120-124	8	8	16
115-119	10	13	23
110-114	3	12	15
105-109	3	9	12
100-104	0	1	1
95- 99	1	2	3
N	49	70	119
Mean I.Q.	125.9	119.5	122.1
S.D.	7.8	9.3	9.6

TABLE III

TERMAN-McNEMAR MEAN I.Q.'S AND S.D.'S FOR SUPERIOR AND NORMAL GROUPS

	Superior Accelerated			Superior Control			Normal Accelerated			Normal Control		
	Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Total
N	33	35	68	33	35	68	16	35	51	16	35	51
Mean I.Q.	129.6	130.0	129.8	132.0	127.7	129.8	112.6	111.4	111.8	113.3	111.3	111.9
S.D.	6.0	8.4	7.3	7.6	6.5	6.8	3.5	6.1	5.4	6.0	5.6	5.8

TABLE IV

DISTRIBUTION OF AGES OF SUPERIOR ACCELERATED GROUP AND SUPERIOR CONTROL GROUP

	Superior Accelerated (I.Q. 120 or above)			Superior Control		
Age in yrs. and mos.	Boys	Girls	Total	Boys	Girls	Total
15-9 to 15-11	.....	1	1	1	1	2
15-6 to 15-8	.....	1	1	1	3	4
15-3 to 15-5	2	2	4	12	11	23
15-0 to 15-2	4	6	10	11	11	22
14-9 to 14-11	12	5	17	8	9	17
14-6 to 14-8	4	7	11	.....	.....	.....
14-3 to 14-5	5	9	14	.....	.....	.....
14-0 to 14-2	4	2	6	.....	.....	.....
13-9 to 13-11	2	2	4	.....	.....	.....
	33	35	68	33	35	68
Mean Age	14-8	14-8	14-8	15-5	15-5	15-5
Range in Months	20	26	26	14	14	14

Academic progress was determined by the results of the Grade IX final departmental examinations. The marks obtained by the accelerated students and the control students in Reading, Literature, Language, Social Studies, Mathematics, and Science were recorded from the files of the Calgary high schools and from the Examinations Branch. Letter gradings were given the following values: H—5, A—4, B—3, C—2, D—1.

TABLE V

DISTRIBUTION OF AGES OF NORMAL ACCELERATED GROUP AND NORMAL CONTROL GROUP

	Normal Accelerated (I.Q. under 120)			Normal Control		
Age in yrs. and mos.	Boys	Girls	Total	Boys	Girls	Total
15-9 to 15-11	.....	2	2	2	4	6
15-6 to 15-8	1	1	2	4	11	15
15-3 to 15-5	.....	3	3	7	8	15
15-0 to 15-2	4	12	16	3	11	14
14-9 to 14-11	6	10	16	.....	.....	.....
14-6 to 14-8	4	.....	4	.....	.....	.....
14-3 to 14-5	.....	4	4	.....	1	1
14-0 to 14-2	1	2	3	.....	.....	.....
13-9 to 13-11	.....	1	1	.....	.....	.....
N	16	35	51	16	35	51
Mean Age	14-10	14-11	14-11	15-5	15-4	15-5
Range	24	30	30	12	21	21

The social and personal development of pupils was studied in several ways. The accelerated and control students were asked, by questionnaire, to state the number of official positions which they had held during the preceding four years, to list the athletic teams for which they had played during the same period of time and to enumerate the social activities in which they had participated during the previous month. Each student was asked to rate himself on a scale of eight personal and social traits, namely, talkativeness, sensitivity, flexibility, persistence, shyness, emotionality, anxiety, and friendliness. The opinions of the accelerated students regarding how acceleration had helped or hindered them in their school work, in their personalities and in their social lives, were solicited.[8]

Teachers of twenty-four accelerated students and the twenty-four corresponding control students were asked to rate them on a scale similar to the self-rating scale mentioned above.

Findings

Academic Progress of Accelerated Students

For each of the six examination subjects, the mean score and standard deviation were computed for the accelerated groups and

[8]The latter part of the student questionnaire was adapted from a survey form used in Crescent Heights High School in Calgary.

the control groups. In each case, the critical ratio was found in order to determine the significance of the differences. The method of comparison was similar to that used by C. Safran[9] in a "Study of the Value of Kindergarten Training in the Calgary School System." Table VI summarizes these data.

TABLE VI

THE SIGNIFICANCE OF DIFFERENCES IN MEAN SCORES OBTAINED IN GRADE IX FINALS BY ACCELERATED AND CONTROL STUDENTS

Superior Groups	Reading	Lit.	Lang.	Soc. St.	Math.	Sci.
Accelerated						
Mean Score	4.4	4.33	4.1	4.16	3.97	3.84
Standard Deviation	0.55	0.58	0.74	0.65	0.82	0.87
Control Group						
Mean Score	4.6	4.45	4.4	4.31	4.03	4.11
Standard Deviation	0.65	0.61	0.69	0.85	0.68	0.87
Critical Ratio	1.96	1.18	2.5	1.23	0.46	1.8
Normal Groups						
Accelerated						
Mean Score	3.31	3.43	3,61	3.33	3.31	3.14
Standard Deviation	0.7	0.72	0.79	0.67	0.78	0.65
Control Group						
Mean Score	3.47	3.43	3.57	3.57	3,33	3.35
Standard Deviation	0.6	0.67	0.67	0.82	0.93	0.88
Critical Ratio	1.23	.....	0.29	1.71	0.11	1.4

The superior control group obtained a higher average mark in all of the six subjects than did the superior accelerated group. The difference in average marks was least significant in Mathematics. The differences in Literature, Social Studies, and Science were not statistically significant. In Reading, the difference was significant at the 5 per cent level. The superior control students made significantly higher marks than the superior accelerated students in Language. The difference was significant at the 1.24 per cent level.

[9]C. Safran, "Study of the Value of Kindergarten Training in the Calgary School System." Unpublished Calgary School Board pamphlet, pp. 4-5.

None of the differences found between the mean gradings obtained by accelerated students whose intelligence quotients were less than 120 and those obtained by the corresponding control students was statistically significant.

The most noteworthy finding with respect to academic progress seems to be that generally the differences in achievement of accelerated and non-accelerated students were not statistically significant. However, the differences found in Reading and Language were in favor of the non-accelerated students.

Social and Personal Development of Accelerated Students

Fewer official positions were held by accelerated students. Accelerated boys belonged to almost as many athletic teams as the control boys. Accelerated girls did not play on as many athletic teams as the control girls. Compared with the control students, accelerated students were less active socially. Table VII presents the mean score and median score for each group with respect to official positions held, athletic team membership and participation in social activities.

TABLE VII

SOCIAL AND PERSONAL DEVELOPMENT OF ACCELERATED STUDENTS

	Superior Accelerated			Superior Control			Normal Accelerated			Normal Control		
	Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Total
Official Positions Held												
Mean	1.3	1.9	1.6	2.1	2.6	2.5	2.2	2.2	2.2	1.6	2.3	2.1
Median	1.1	1.7	1.4	2.4	2.7	2.5	1.8	2.3	2.2	0.9	2.3	2.3
Athletic Team Membership												
Mean	5.3	3.5	4.4	6.8	5.3	6.0	5.5	4.0	5.0	6.2	4.8	5.2
Median	4.9	3.1	3.8	4.8	4.8	5.3	4.5	3.6	4.0	6.2	4.8	5.2
Participation in Social Activities												
Mean	10.2	12.1	11.2	11.8	12.3	12.1	11.9	10.3	10.8	11.1	11.6	11.5
Median	7.8	11.3	9.2	11.8	11.9	11.8	10.5	10.5	10.4	11.0	11.9	11.4

In general, the responses of accelerated students to the self-rating scale showed the same trends as those of the control students. Accelerated students rated themselves in much the same way as the control students did in talkativeness, anxiety, sensitivity and

friendliness. Superior accelerated students tended to rate themselves slightly higher in adaptability. A greater degree of self-confidence was reported by accelerated students. Accelerated students considered themselves slightly more emotional than did control students. Most noteworthy perhaps was the trend shown by accelerated students having intelligence quotients below 120 to have a feeling of being easily discouraged.

To the teachers who rated twenty-four accelerated students and twenty-four control students, superior accelerated students appeared to be, in a few instances, more talkative, more excitable and more self-confident than the control students. Accelerated students seemed to be less sensitive than the control students. Teachers' ratings of the persistence, adaptability and friendliness of accelerated students were as high as the ratings of control students. The number of students rated as easy-going or extremely carefree was slightly greater for the superior accelerated students than for the superior control students. There were, however, fewer normal accelerated students than normal control students rated in this manner. The number of teachers' estimates of the social and personal development of students was too small to be statistically significant. Nevertheless, the data suggested that accelerated students were rated as highly as other students in personal and social characteristics.

The opinions of only the superior accelerated students regarding the effects of rapid promotion were considered. That acceleration was advantageous in one's school work was the opinion of forty-eight per cent of this group. That being younger was a hindrance, academically, was stated by thirty-five per cent. In the development of one's personality, acceleration was considered by fifty per cent as helpful and by forty-four per cent as harmful. Forty-three per cent of the superior accelerated students thought that being with older students had helped them socially, but sixty per cent declared that being younger than their fellows had hindered them in their social life.

Conclusions

1. The self-ratings on a scale of personal and social traits by accelerated students showed the same trends as the ratings of control students. Therefore, accelerated students considered themselves reasonably well-adjusted. To teachers, accelerated students appeared to be just as well-developed as non-accelerated students both socially and personally. However, accelerated students were not as active socially as others. They were not chosen as often to play on athletic teams or to be leaders.

Many of the Grade X accelerated students were at a disadvantage as athletes and as leaders because of their size. However, the difference in age between the accelerated and non-accelerated students might account for the social differences.

Probably accelerated students were just as well-developed socially and personally as other students of the same age.

2. That acceleration is an advantage in one's school work and in one's personality, but a hindrance in one's social life seemed to be the opinion of many accelerated students.

3. Generally, the differences in academic achievement between accelerated and non-accelerated students were not statistically significant. In the Grade IX Reading Test, the difference in the marks obtained by the superior accelerated students and by the superior control students was significant at the 5 per cent level. In the Grade IX Language Test, the difference in the marks obtained by the superior accelerated students and by the superior control students was significant at the 1.24 per cent level. In both reading and language, the non-accelerated students made higher mean scores. However, it must be remembered that the accelerated students were younger than the control students. In general, the accelerated students, in spite of this age difference, were able to hold their own academically.

Recommendations for Further Study

1. A study of the effects of acceleration on the academic progress and on the personal and social development of Grade XII students would be of value in indicating adjustments made by students two years older than those in the present study. The results of the Grade XII final examinations could be used as measures of scholastic achievement. The use of percentile rankings would be preferable to letter gradings.

2. An additional study at the University level would demonstrate whether or not there are any lasting effects of acceleration. Academic progress could be determined by a comparison of the marks obtained at the end of the freshman year by accelerated and non-accelerated students. A follow-up study could be made at the end of the year of graduation.

3. In order to allow the age factor to remain constant, a group of accelerated Grade XI students could be compared with non-accelerated Grade X students. Standardized achievement tests could be used to measure academic progress. Although the school environment for the two groups would be different, such

a study should indicate to a degree how accelerated students compare socially and personally with non-accelerated students of the same age.

BIBLIOGRAPHY

Clarke, S. C. T. "Promotion Practices and Policies in Alberta Schools." *Alberta Journal of Education Research* I:4 (December, 1955), pp. 24-34.

Justman, J. "Academic Achievement of Intellectually Gifted Accelerants in Senior High School." *School Review* 62 (November, 1954), pp. 469-473.

Pressey, S. L. *Educational Acceleration: Appraisals and Basic Problems.* Bureau of Educational Research Monographs, No. 31. Columbus, Ohio, Ohio State University, 1949.

Safran, C. "A Study of the Value of Kindergarten Training in the Calgary School System." Unpublished pamphlet of the Calgary School Board, 1953.

Terman, Lewis M., and Oden, Melita H. *Genetic Studies of Genius, Vol. IV, The Gifted Child Grows up: Twenty-Five Years Follow-Up of a Superior Group.* Stanford, California, Stanford University Press, 1947.

Trusler, J. W. "Pupil Acceleration in the Elementary School." *Grade Teacher* 47 (October, 1949), pp. 16-17, 96-98.

Witty, Paul, editor. *The Gifted Child.* Boston, D. C. Heath Company, 1951.

————. "Education for the Talented and for Leadership." *Teachers' College Record,* 57 (February, 1956) pp. 295-300.

Worcester, D. A. *The Education of Children of Above Average Ability.* Lincoln, Nebraska, The University of Nebraska, 1955.

THE OBJECTIVES AND ACHIEVEMENTS OF THE SCOTTISH COUNCIL FOR RESEARCH IN EDUCATION

G. M. Dunlop
Faculty of Education
University of Alberta

The Scottish Council for Research in Education was organized in 1927. In it are represented the Association of County Councils, the Association of Counties of Cities, the Educational Institute of Scotland, the Association of Directors of Education in Scotland, the National Committee for the Training of Teachers, Training Centres and Colleges, the Universities, the Scottish Branch of the British Psychological Society, and the Association of School Medical Officers of Scotland. The Council consists of thirty-eight members. It held its first meeting in June, 1928, and was incorporated as a Limited Company in 1932.

The objectives of the Council, as set forth in its original constitution, are as follows: to encourage and organize research work in education in Scotland and, in particular, to initiate and control special investigations, making the necessary arrangements with the appropriate authorities; to receive suggestions for research; to allocate problems to suitable investigators; to finance approved investigations, wholly or party; and, finally, to authorize the publications of results and recommendations.

The Council meets semiannually. An Executive Committee of fourteen members implements the plans of the Council; The Finance Committee prepares the annual budget, allocates funds and presents accounts at stated meetings of the Council.

The operations of the Council are financed by annual grants from the Educational Institute of Scotland, Educational Authorities, and, more recently, from County Council and Counties of Cities. Grants from individual educational authorities and counties tend to be in terms of numbers of pupils. Since 1946, under the terms of the Education Act, (Scotland) the Education Department has made grants to the Council. Substantial contributions have also been received from international and national committees and organizations, usually for the advancement of a particular research project.

From the creation of the Council in 1928 till 1946 the staff consisted of an honorary director, a full-time secretary and an office assistant. In 1953 the staff was unchanged save for the addition of a research officer and two more office assistants. The Council maintains an office and technical library.

From the first the Council has recognized the conduct and publication of the results of research as its major role. Periodically it has surveyed the field of educational research for problems requiring attention. These have been arranged in order of priority, and either incorporated in the Council's program, or assigned to some other research group for study. Thus it has played an imporant role in the stimulation and coordination of research throughout Scotland. It has steadily refused to accept a role involving test construction on the grounds that this activity would require a full-time technical staff, and would direct its energies and resources toward ends inconsistent with its objectives.

The work of the Council over its twenty-eight years is of interest to Albertans. A listing of its major research efforts follows, accompanied by comments where warranted by the apparent interest or importance of the study.

1. **City and Rural Schools: A Comparison of the Qualifying Candidates,** 1938.

   This comparison revealed that both in intelligence and attainment the small country schools and the large town or city schools show to better advantage than schools of medium size.

2. **Achievement Tests in the Primary School,** 1934.

   A comparison of all the 'eleven-year-olds' in all Fife schools with the norms of an American achievement test demonstrated that the Scottish children are sixteen months ahead of American children of the same age. A subsidiary study revealed the superiority to be present at 7½ years. This advantage is attributed to the fact that Scottish children enter school a year to fifteen months earlier than American children.

3. **Age-Grade Distribution of Primary Pupils,** 1937.

   The percentage of children retarded two years or more in Scottish schools was 7.82 while the corresponding percentage of acceleration was 0.33.

4. **Time Allocation to Primary School Subjects,** 1937.

   The same study revealed 'convincing evidence' of the lack of uniformity in time allocation to the various subjects of the curriculum.

5. **Examinations,** 1932.

   Investigation of certain aspects of examinations resulted in the conclusion that there was wide divergence in the amount of time devoted to examinations in Scottish schools. In some extreme cases 15 per cent of teaching time was so occupied.

The unreliability of teacher's judgment of attainment was also confirmed.

6. **Technique for Promotion to Secondary Education,** 1942.
   The International Examinations Inquiry held under the auspices of the Carnegie Corporation of America resulted in a study of the relative merits of various procedures used in making promotions to secondary education. It was found that the most effective battery was "I.Q. + Qualifying Examination + teachers' estimates (scaled)." The order of merit of single measures was teachers' scaled marks, scholastic tests and I.Q. It was recommended that teachers might employ more standardized tests and improve their standards of marking.

7. **Allocation of Pupils to Different Secondary Courses,** 1936, 1944.
   Tests of ability in English, modern languages, algebra, geometry and science were devised for determining types of ability, on the basis of which people could be directed into the appropriate secondary school programs.

8. **Prognostic Value of the Leaving Certificate for Success at University,** 1933.
   No significant difference was found between the prognostic value of teachers' marks and marks of the Scottish Education Department for success in university examinations. The coefficients of relationship were low, due to the fact that they referred only to pupils successful on the Leaving Certificate Examination.

9. **Curriculum for the Advanced Division,** 1932.
   In anticipation of the raising of the compulsory school age, the Council agreed to investigate curriculum appropriate to pupils of 12 to 15 years of age. Thirteen panels held a total of sixty meetings, the recommendations being published in a report of the Council.

10. **Classroom Problems.**
    Basic and applied research has been conducted in arithmetic, reading, spelling and language over the years.

11. **Practical Problems in Teaching Method,** 1938.
    Study of stenographic reports of actual lessons led to the publication of general conclusions on this matter.

12. **Teaching Aids,** 1940.
    By use of a Teacher's Appraisal Form and Pupil's Appraisal Form more objective evaluation of educational films was made possible.

13. **Physical Defects.**

A group test for color blindness was prepared. In 1952 a survey of 4,000 twelve-year-old pupils in Fife was initiated with a view to discovering the incidence of deafness, the degree of loss of hearing, and the influence of varying degrees of hearing deficit on I.Q. and achievement.

14. **Mental Testing, 1932-47.**

This survey covered all 11 year old children in Scotland. A group test of intelligence of the usual verbal type was used with pictorial items for the benefit of duller pupils. The finding was that the mean I.Q. of Scottish boys was close to 100 with the girls slightly, but not significantly, less. A study of the distribution suggests that less than five per cent may be described as special pupils for whom special provision might be made. Half may be regarded as approaching subnormal, half as supernormal.

The 1947 survey was undertaken to answer the question of the anticipated decline in national intelligence resulting from a differential birth-rate. To answer this and other questions the group test was administered to the eleven-year-old group in 1947. Contrary to expressed fears the results showed a rise of 2.284 points out of a total of 76 on the mean group test score. *Social Implications of the 1947 Mental Survey* reports on the social aspects of the 1932-47 study. It reveals but does not explain the negative association of intelligence and family size. It provides evidence, for Scotland at least, that there are no marked differences in distribution of intelligence between urban and rural areas. While the differences are not significant, the mean score of the most remote and isolated districts, The Highlands and Islands, is highest; next comes the rural areas, third, the four cities, and last the industrial belt. This finding is at variance with current findings in America, and Alberta.

15. **Modification of Terman-Merrill Revision of the Stanford-Binet Scale, 1938.**

In 1938 a sub-committee was established to recommend modifications of the 1937 Revised Stanford-Binet Scale. Copies of the modifications have been distributed and are widely used today. A study of the effectiveness of the Stanford-Binet items has been made for a sample of 2,050 Scottish children from 6 to 12 years of age.

16. **Environmental Influence on Mentality,** 1936.

Three hundred children moved from slum areas to an improved

environment were tested at the time of the change in residence, and 12 months and 18 months later. Evidence was produced of a slight but detectable acceleration in the transferred group. This confirms previous studies.

17. **Bilingualism, 1942.**

Two hundred and fifty bilingual eleven year old children in the Hebrides were compared with a similar number of monoglot Shetland children by means of four group tests of intelligence, of which two were verbal and two non-verbal. The study revealed a slight inferiority in the bilingual children, which fell short of attaining significance.

The Council stands committed to a study of the educational implications of the 1947 Mental Survey. A scholastic survey for the whole of Scotland of one or more age groups with a view to the diagnosis of weaknesses in mastery of primary school processes is contemplated. There is to be a study of the distribution by counties of entrants to Scottish universities, in the effort to discover inequalities of opportunity, if any, and their causes. Finally studies of handwriting and spelling are in the planning stage.

The continuity and quality of the work of the Scottish Council for Research in Education is impressive. In large measure its success must be recognized as the result of the efforts of its first honorary director, Sir Godfrey Thompson, Professor of Education, Edinburgh University. A foundation member of the Council in 1928, he was in almost continuous association with its work until his death in 1955. He served as Chairman of the 1947 Mental Survey Committee. While the research program may be said to have arisen from the developing needs of Scottish education, the concern for precision and rigor in its execution, and the continued interest in the factors influencing the intelligence of school children must be attributed to its first director, Sir Godfrey Thompson.

A COURSE REVISION COMMITTEE IN ACTION

J. R. Meredith
Department of Education
Victoria, B.C.

"I certainly enjoyed the work . . . and how it happened to be such an easy group to work with just seems to have been a marvelous coincidence." This comment was written by a member of a revision committee on a questionnarire eliciting opinions on the group precedures used during eighteen months of committee work. In this time, members had engaged in long hours of discussion, had examined countless texts and references, and had prepared detailed written drafts of course material. The work at times had seemed extremely difficult and the discussions had exposed sharp differences of opinion. What had made this an easy group to work with? Was it just a marvelous coincidence? Was it the personalities of the members? Or was it, possibly, the fact that group participation had received a little more attention than is customary with committees of this kind?

Traditionally, curriculum development in Canada has been a process of revising courses of study and issuing official bulletins. Although recent changes[1] have increased the basis of participation by teachers and laymen, the basic frame of reference and the procedures[2] followed in most Provinces have not been radically altered. The actual work of revision is generally undertaken by a small committee appointed by the department of education and assigned the task of selecting a text-book and writing a course outline. As might be expected, this form of curriculum revision tends to place emphasis upon securing a finished product for approval and official authorization. Although there may be considerable freedom of discussion in the committee, the necessity of meeting the requirements of a centralized authority is an ever-present influence. Leadership tends to be somewhat formal and authoritarian. Group participation may consist chiefly in preparing assigned sections of the work for approval. As a result, there may be little evidence of a strong feeling of group interest and responsibility for the ultimate success of the product in the classroom. Nor is there much

---

1A. B. Morrison, "Curriculum Construction," **Canadian Education Today.** New York: McGraw Hill Co., 1956, p. 77.

2The Canadian Education Association, **Procedures in the Preparation of Curricula, Report No. 69, June 1954.**

attention paid to the potential value of the experience for the members of the committee themselves.[3]

Our committee decided on a different course of action. This report describes some of the proceedings that were followed. It is not a research study. Essentially, it is a report of one observer's impressions of the work of a particular committee. In this case, specific attempts were made to observe and apply new concepts of group procedures in a practical situation. The steps were:

(1) To determine our purposes to our mutual satisfaction.

(2) To develop our own method of procedure.

(3) To evaluate the effectiveness of the procedures we used.

The results suggest interesting possibilities not only for educational research, but especially perhaps for the work of curriculum revision.

The writer, as a member of the curriculum branch of a provincial department of education, was assigned to work with a committee of ten teachers appointed to revise a senior high school course in social studies. With the approval of the members he combined his role of "consultant" with that of secretary to the committee. In this capacity he was able to relieve members of a considerable amount of routine in the preparation of materials. It was hoped, too, that this position would to some extent annul traditional concepts of authority often associated with official positions.

The following procedures were used to gather material for this report:

(1) Prior to each meeting notes were made for personal guidance, recording observations of past proceedings, and anticipating problems likely to arise.

(2) Following each meeting a detailed record of discussion was prepared from notes made as accurately and objectively as possible. Names were not used.

(3) At the conclusion of the work an informal questionnaire was completed by each member.

Notes and Reports of Meeting of the Committee

The following excerpts from the narrative account indicate the type of information collected, the nature of the problems that arose, and the effectiveness of the procedures used.

Secretary's Notes for First Meeting. This committee is composed of ten members all of whom have had a minimum of five years teaching experience. Two are younger than the others but all are experienced in the field of social studies. At least three have taken history honours . . . . We can expect a

[3]For teachers' reactions to similar situations, see Stephen M. Corey, **Action Research to Improve School Practices**, New York: Bureau of Publications, Teachers College, Columbia, 1953, p. 48.

fairly traditional course . . . . There has been some disagreement between the local associations on the wisdom of undertaking this revision. It may influence opinions. Discuss the question it if arises. Prepare suggestions for content of course outlines for use if necessary . . . .

Report and Observations of First Meeting. The first meeting was devoted to informal discussion of social studies, the content and structure of a course outline, and a variety of related topics. The following discussion is typical:

Chairman: Do we want a comprehensive outline as we have in . . . .

Member: It should not be too detailed . . . teachers attempt to cover everything . . .

Member: And then complain that the course can't be covered!

Member: What about the needs of the inexperienced teacher? Shouldn't we consider this?

Member: I like the idea of two columns, one for content, one for directing the teaching.

Chairman: I think we give too much direction . . . surely teachers have some training at this level . . . we can't do everything. Besides some of those directions in . . . are not practical.

Secretary: There are probably many . . . we did a survey once showing the number . . . who haven't had as much experience as you people. You have developed some good ideas for teaching that seem natural to you. But these are not necessarily widespread (illustration of some undesirable but not uncommon practices).

Member: We need a happy medium . . . not too much philosophy!

Member: That's just window dressing. Teachers don't read it. Keep this to a minimum. (agreed)

Secretary: Perhaps the fault lies in the way we state it.

Member: Could we look at other courses? (the secretary was asked to provide a library of material)

Discussion continued in this vien for some time, then,

Chairman: Well Mr. Chairman . . . I mean Mr. Secretary . . . where do we go from here?

Secretary: Suppose I summarize for the record some of the suggestions you have made. This we could amend at any time but it will help to get something done. (Summary read)

Chairman: How about each one preparing a brief outline of his ideas of what this course should include for the next meeting (agreed). When should we meet? (Note one member suggests meeting at his home.)

Secretary: Before adjourning, I'd like to raise a problem that may be worrying some of you. Some of you may be members of associations that have expressed disagreement with the plan to revise this course. Does anyone feel he is being placed "on the spot" by being asked to act? (There was considerable discussion on this point.)

Chairman: I went into this question with the department and others (teachers) . . . Many of us would prefer to see another course but failing that it seems wise to do something about this one. (There was general agreement with this position.)

Secretary's Notes for Second Meeting. Not a great deal was produced at the first meeting. Note that the discussion "wandered" a bit but this is probably necessary . . . Members of the committee have a good sense of humour which may be an asset . . . Note that Chairman seems to feel that I am in charge. Probably I should refrain from participating . . . keep more in the background . . . difficult, when you're interested. Some explanation of the selection of members might help in offsetting any factors causing lack of harmony. Members are from districts geographically removed. They

are also from local associations which have not always agreed. This may be a factor here . . . Relationships fairly formal but good.

Report and Observations of Second Meeting. An interesting discussion arose concerning the purpose of the course:

Member: As an introduction to this course I think we have to state what we are trying to do . . .

Member: The answer to that is we were told what we should do and there's not much we can do about it. Isn't that right Mr. Secretary?

Secretary: I suppose you're right in a way. Could we perhaps approach it a little differently. You may recall what led to the appointing of this committee . . . various proposals made . . . considering the total curriculum it was not possible to accept some . . . but I don't think anyone was too happy with the present situation. Hence the general directive. Now, there may be some value in getting our own ideas clear on what should be done within this general directive . . . what should a course in modern world developments attempt to do? What values could it have? . . . If our conclusions are not quite in line with our directive, we'll change the directive! (Laughter)

There was considerable discussion here. A good spirit existed. The whole process seemed to be that members were reaching a concensus concerning the purpose of their work. Each member, including the chairman, presented his outline of what this course should be and had the opportunity to explain it. Each was subject to slight critical comment but no attempt was made to settle disagreements at this stage. A considerable time was taken but it seemed worthwhile.

Secretary's Notes for Third Meeting. Part of the value of the previous meeting may be due to the fact that it was held at the home of one of the members. Opportunity for social conversation afterwards contributed to good relationships . . . Problem at this meeting will be one of deciding what to do and how to go about organzing the work. My experience with previous committees indicates two or three procedures that could be used. Should I present these? It might be better if members tackle the problem in their own way. Make suggestions only if needed to prevent getting "bogged down" on procedure.

Report and Observations of Third Meeting. Meeting opened with further reference to the outlines previously prepared . . .

Chairman: Our problem seems to be which of these do we accept and what do we do with it? I made an analysis which shows that none of us is very far apart (passes out chart). (Discussion)

Member: Our problem seems to be how to select . . .

Secretary: In terms of what we are attempting to do?

Member: Yes. Although that doesn't seem to help much.

Member: I suggest we agree on what topics should be taught and then organize them into units with specific suggestions for teaching them. (Discussion of topics)

Chairman: Where do wo go from here? What do you think Mr. Secretary?

Secretary: It is one possible approach. I wonder if anyone else has a plan of how we go about this?

Member: Mr.———— and I didn't think much of the outline we prepared for the last meeting so we took copies of everyone else's and "plagiarized" to make a new one. It's bound to be good! (Laughter) (Copies distributed and discussed. Content, method organization and details were discussed and suggestions made for modification. Group seemed to get lost in detail. Meeting adjourned and continued on the following day.)

Chairman: I see the Secretary has a lot of notes on this. They will be distributed to members. It seems to me we could accept this outline as a

framework. How do the rest of you feel about it? (Agreed) What should we do now?

Member: We might each take a section and expand it.

Member: Possibly we could work in pairs?

Chairman: Is this acceptable? (Agreed. Members took sections in which they were most interested and agreed to prepare expanded drafts for next meeting.)

Secretary: Just by way of comment, I wondered how you were going to deal with this problem . . .

Member: So did we! (Laughter)

Secretary: It was most interesting. There are no "experts" in this business. We have to work these things out and that takes time. It might be an idea to keep in mind the discarded materials which may contain good ideas. When you realize that what you do here will affect what will happen in every grade ten classroom next September you will appreciate the need for as many good ideas as we can get.

Secretary's Notes for Fourth Meeting. One member seemed reluctant to go along with group opinion on organization at the last meeting. He may feel he didn't get a chance to explain his approach fully. (This is verified later when he completed the evaluative questionnaire.) Perhaps his difficulty lies in explaining clearly what he wants. Perhaps the others are unconvinced. He is from another district and seems younger than the others. This may account for his attitude. When it comes to group discussion of each expanded topic there may be difficulties in relationships. He and one other are working on a very difficult section. On the other hand, he is liked and respected as a person. There may be a place for giving an established set of professional criteria to the group to use as a basis for the critical examination they must make sooner or later e.g., (a) significance of content to field of knowledge (b) needs of pupils and (c) test of survival, difficulty, etc. This would place discussion on an objective level.

Report and Observations of Fourth Meeting. Assignments had previously been sent into the Secretary and copies had been made for all members. The meeting was devoted largely to discussion and criticism of topics as they were developed. Two such topics were revised. The Secretary took down the revisions as suggested.

Prior to discussion the Secretary gave a brief outline of criteria for selecting subject matter. It may have been of some value in bringing out the following:

Member: I would suggest asking pupils to contrast their life today with what it was in medieval times . . .

Member: Students might debate or discuss question, "Is the Renaissance spirit alive today?"

Member: It seems to me we should use the art and music departments here.

An interesting indication of group spirit was noted in the discussion of the Reformation.

Member: I feel we have an unbalanced treatment indicated here. How does ———— feel about it?

Member: It seems quite reasonable. I don't see much objection to it.

Member: Well, I think we should reword it slightly so that it will not offend religious beliefs.

Member: Reference should be made to the reforms within the church.

(There was some evidence of a feeling of impatience as discussion continued.)

Member: We just can't teach everything. Why not leave it and let the teacher add whatever he wishes?

The group was persistent. The Chairman was careful to call for opinions, particulary from those who did not enter discussion too freely.

Secretary's Notes for Fifth Meeting. This will be one of the more difficult meetings. The topic scheduled for discussion introduces some difficult and new material. Those who prepared it have already experienced some disagreement. Conflict of personalities will complicate matters. What should one do to avoid this conflict? It takes mature people to disagree properly and constructively. Probably desirable to interject suggestions designed to keep discussion on professional level.

Report and Observations of Fifth Meeting.

Chairman: This topic is much too complex . . . and too dificult . . . ideas are far too abstract for these pupils (reads sections).

Member: (author) Could we review the whole topic and its development first?

Chairman: But the whole thing is too abstract.

Member: Why stress geography?

Member: All I can do with my classses is . . . (describes procedure).

Member: Shouldn't we keep the same approach we've suggested for other topics—begin with definition . . . (agreed)

Chairman: I can't go along with the idea of teaching this material about South America . . .

Member: But South America is probably of equal importance to Europe . . .

Secretary: I think we're all on the wrong track here. We're just organizing adult material in an adult fashion without any regard to the purpose or the pupils. We're too prone to take the material we learned, we were interested in, we enjoy teaching it. How much is remembered? How much is understood? Or of any value?

Member: Wouldn't some of these criticisms apply to everything we've done?

Secretary: You're right. I'm exaggerating. But I do feel that we should try to build on what has been prepared.

The discussion continued until as the Chairman put it "the law of diminishing returns set in." However, the group simplified and reorganized the topics to the satisfaction of the majority, at least. Following this meeting, refreshments were served and the group relaxed.

Secretary's Notes for Sixth Meeting. The previous meeting was probably the least successful so far in terms of relationships. The chief weakness lay in the fact that strong opinions and feelings entered into the discussion. On the other hand, there is no question but that the revisions made were good. Now to try to build up morale again!

Reports and Observations of Sixth Meeting. Opened with remark that authors of next topic had withdrawn it and made another because they were "afraid of what might happen to them." (laughter)

Routine of discussing and suggesting changes was carried on amicably. Several practical suggestions were made for guiding teaching.

Chairman: Do you think we can get into discussion of the depression?

Member: We should be able to give pupils some idea of what it was. After all, this is a social studies course and we don't seem to be paying much attention to the economic aspect . (Members agreed.)

Secretary: This seems a sound comment. How would you teach it?

Member: Well, I would explain what it was and why is occurred . . .

Concluding Meetings

The same procedure as noted above was followed for all meetings. It was observed that as the work continued morale rose. The use of first names, and the telling of "stories" or reminiscences were frequent. Two members received new appointments and were enthusiastically congratulated. Meetings were held more frequently in private homes.

A final draft of the whole course was prepared by the Secretary. It was pointed out that everything in this draft was the work of the members of the Committee. This "clerical job" relieved committee members of a rather tedious process. It looked quite impressive and all members seemed to feel proud of the fact that they had made definite progress. The draft was again reviewed and further suggestions were made.

It seemed evident to the Secretary that the work was rapidly nearing completion although this was not generally recognized and the final meeting came as a bit of a surprise to some. At his suggestion one meeting included a group dinner at department expense which seemed to add a good touch to relations between teachers and department. This turned out to be the final formal meeting.

Evaluation

Validity of any evaluation of the group processes and procedures undertaken in this study is limited by two factors. The first is the lack of objective criteria and the consequent lack of data on which to base the evaluation. The second limitation common to many educational "experiments" is the difficulty of placing oneself outside of the project and maintaining a completely detached viewpoint. Nevertheless the idea of evaluating seems sound. It was attempted in this case and some of the results may be worth mentioning. These are the opinions expressed by members of the Committee on an informal questionnaire summarized as follows:

(1) Purpose:
   (a) All members agreed with the statement that "within the general purpose . . . we developed and agreed upon some ideas of our own as to what our purpose should be."
   (b) All members agreed with the statement that "what we were doing was essentially worthwhile."

(2) Organization and procedure:
   (a) Time, place, frequency of meetings, size of committee, were considered adequate by six out of ten members. Those disagreeing offered suggestions for improvement.
   (b) No member felt that the presence of a departmental official "resulted in a tendency to dominate or restrict the work."
   (c) Nine members felt that the time the committee spent in working out its own approach and procedure was an effective way of functioning.
   (d) Nine members considered the morale of the Committee was "generally excellent;" one considered it "reasonably good."
   (e) Nine members felt that they had sufficient opportunity to present their ideas; one disagreed.

(3) General reaction:
   (a) All members felt that to some extent they had changed their opinions as a result of discussion.
   (b) All members felt that they had gained something from the experience of working on this committee.
   (c) Specific comments:
      (i) "how it happened to be such an easy group to work with just seems to have been a marvellous coincidence"
      (ii) "we should have held longer meetings to permit the discussion of seemingly unpopular ideas"
      (iii) "our committee gained much from the wisdom of 'tried hands' and from the vigor and enthusiasm of new members"

Conclusions

It is the opinion of the writer that the enthusiasm and interest shown by all members was due in part to the fact that, contrary to some traditional procedures, a definite attempt was made to involve the group in the whole problem and to avoid "editing" or censoring their work. The Committee was made to feel that it had the complete confidence of the Department. Furthermore, the fact that the mechanics of organization (i.e. into sub-committees and individual reports) were developed by the group in the process of carrying out its objectives seemed to produce more originality and creativity in the work undertaken than might have been the case with more stereotyped procedures. Some of the techniques for classroom teaching were ingenious and practical. One weakness may be a lack of professional references to principles and method. Perhaps a curriculum bulletin is not the best place for these. The course itself might be considered largely traditional in concept and organization.

It was personally gratifying to note that the attempts to provide some assistance from a curriculum worker were apparently well received. The danger in having officials present is two-fold: first, that unconsciously or otherwise their experience tends to direct the group at times when it should work out its own problems; second, that personal liking or respect for the official can becloud the independent critical judgment of the individual. The idea of having a department member act as secretary was effective, first in "toning down" any "prestige" influence of any official and second in relieving the Committee of much burdensome clerical and mechanical work. The latter resulted in greater attention being given to the more creative aspects of the work.

Attempts to improve morale appeared to be highly successful. Each of the six members expressed the opinion that the morale of the group was either reasonably good or generally excellent. It is interesting to note that morale is not a static thing. It was not consistently high. But having confidence in all members and respect for each individual does much to improve the attitude to work.

So far as inservice growth is concerned, it has already been noted that we sometimes lose sight of the potential values that participating in a course revision can have for individuals. In this case, all members considered they had gained from the experience. Probably some attempt should have been made to obtain more specific information on this point.

It will be evident from the foregoing that no valid conclusions about curriculum revision work could be drawn. This account may

suggest ideas for more carefully planned studies. The experiences of the writer tend to support the following opinions of those who have studied group procedures:

(1) It is important for teachers and leaders to perceive one another as human beings rather than as teachers and administrators.[4]

(2) Close observation and intelligent questions during the course of meetings are valuable in revealing errors and their origins as well as improvements and their reasons. A full running account of what happens would be most helpful.

(3) The increase of teacher participation in curriculum revision, and the fact that this usually takes the form of group activity, suggests that curriculum workers require not only a sound knowledge of curriculum but as well much skill in working with groups.

BIBLIOGRAPHY

The Canadian Education Association. *Procedures in the Preparation of Curricula.* Report Number 69, June 1954.

Corey, Stephen M. *Action Research to Improve School Practices.* New York: Bureau of Publications, Teachers College, Columbia, 1953.

The Formative Committee, Education Research Section, Ontario Educational Association. *Research in Education.* Educational Research Series No. 27, The Department of Educational Research, Ontario College of Education, University of Toronto, 1954.

Katz, Joseph. *Canadian Education Today,* A symposium. New York: McGraw Hill, 1956.

Sharp, George, *Curriculum Development as Re-Education of the Teacher.* New York: Bureau of Publications, Teachers College, Columbia University, 1951.

[4]George Sharp, **Curriculum Development as Re-Education of the Teacher, New York: Bureau of Publications, Teachers College, 1951, p. 112.**

OBSERVATIONS ON SCIENCE 10 AS AN INTEGRATED COURSE IN PHYSICAL SCIENCE

D. H. JARDINE
Westmount School, Edmonton

Functional vs. Traditional Science

Traditional Aims of Science Teaching

Traditionally, high-school science teaching has had two related basic purposes, to train the mind, and to prepare for college.

The school set out primarily to provide an effective mental discipline. In this task it was greatly influenced by a theory in which the mind was held to be made up of discrete parts or faculties, each requiring a peculiar and vigorous activity for its development. So widespread was the acceptance of this concept that in many older surveys of teacher opinion the disciplinary values received first recognition.

Thorough subject matter became therefore an indispensable tool in education; "its very difficulty was valuable as a discipline." In this regard, the study of the sciences was held to possess particular value:

> . . . They (the sciences) provided unique opportunity for mental discipline by training the faculty of observation, promoting the concentration of thought and energy and providing sense training through the manipulation of materials.[1]

Attempts to meet the second purpose of high school teaching, preparation for college, served greatly to re-inforce the disciplinary claims. Designed to meet university-entrance requirements, both subject matter and methodology in the high schools were rigidly prescribed. Subjects were highly specialized, technical and difficult. Detailed laboratory work was stressed for training in careful observation and precision. As all students were assumed to have the same mental faculties, little concern was felt for individual needs. Instruction was the same for all students, college-bound or not, because the discipline suitable for college entrance was thought to afford valuable training for all.

Reaction Against Traditional Aims

For the past few decades critics have brought these twin supports of traditional teaching under heavy fire. Mental discipline was dispatched to the limbo of outmoded theories and the methods it once justified placed under severe examination. Their survival was

[1]Progressive Educational Association, **Science In General Education**, p. 8.

soon considered evidence of "discrepancies between the best thought in education and current practices in the teaching of science."

With its disciplinary undertones discredited, the preparatory aim fared little better. The demands of university entrance were labelled pernicious. They had forced the high school to neglect many worthwhile educational values through undue pre-occupation with specialized science. Subjects too often were reduced to "a confused mass of abstract technical facts and principles, bearing few discernible relationships to actual life."[2]

So effective were these criticisms that educators soon became increasingly sympathetic to the need for tranferring a subject from a scholastic discipline or a formal college prerequisite into a means of direct education for the activities of life. To this end, science content was selected for its bearing upon the facts, experiences and skills needed in everyday life; and the enrichment of generalization related to common human activities became a major aim of science teaching. A new concern was felt for the ways of thinking and attitudes of mind associated with the scientific outlook. These non-factual or 'intangible' objectives became important enough to transcend other objectives in science instruction.

Education for effective personal adjustment had become a popular goal; science instruction was becoming 'functional'.

Some Implications of Functional Science

Integrated Physical Science—A Generalized Course

Certain attempts at functional science tend toward generalized courses planned to meet the more immediate science needs of the common users of science. This trend has resulted in a decreased emphasis upon "specialized science courses in the senior high school," accompanied by efforts to extend "the general science point of view to the upper grades."[3]

These innovations have taken some interesting forms. In some cases, each branch of science is reviewed in turn, as in general science. Other courses draw upon two or more of the specialized sciences to 'integrate' into one course the pertinent facts and ideas of each. This is a favoured method. It is also a significant one, for it represents an important development in science teaching, namely 'fused' or 'integrated' science.

The integrated course in physical science, then, discards as such the divisions of specialized science. It goes beyond the bounds of

[2]North Central Association of Colleges and Schools, **High School Curriculum Re-Organization, p. 239.**

[3]G. W. Noll, **The Teaching of Science in Elementary And Secondary Schools, p. 145.**

any one subject and involves a re-organization of subject matter and concepts drawn from the whole science field.

Claims Made for the Integrated Course

Freed from the requirements of highly specialized subjects, teachers may be better able to concern themselves with important non-factual values of their instruction. The bearing of scientific discoveries upon personal and social problems, the development of effective problem-solving abilities, the growth of desirable attitudes, may all receive a vigorous re-emphasis. At any rate, such claims have been made.

Noll commends a point of view broader even than that of the chemist, zoologist or physicist. The 46th Yearbook recognizes "superior possibilities of a composite physical science over the separate traditional chemistry and physics courses in contributing to the aims of general education."[4] Finally, of interest to Alberta teachers is the official view from the Curriculum Guide. Here, the integrated approach is justified as being "in keeping with the contribution which science education may make to all students,"[5] not just to those intending to become science specialists.

Organizing The Integrated Course

Educators, however, now face a difficult task. Of all the ways of combining diverse materials into one coherent course, which way will prove the most effective?

Some courses orient their content around a unifying theme which may be consumership, health or safety. Others chose certain basic principles of science. This latter method, approved in 1932 by the 31st Yearbook, has received impressive support. Noll agrees that it "has the greatest possibilities of success."[6] Further approval comes from the 46th Yearbook which states: "The content should be planned so as to develop concepts and pricinciples important not only in physics and chemistry but also in other branches of physical science, namely, geology, astronomy and meteorology."[7] Finally, in Alberta, this method was selected as most suitable for Science 10.

But merely integrating content will not of itself produce an effective course. If the aims of functional science are to be met, careful selection of materials is essential. In this regard, curriculum makers are warned to keep two considerations in mind. First, the sole standard for selecting materials is their ability to aid adjust-

[4]N.S.S.E., **Forty-Sixth Yearbook,** p. 191.
[5]Alberta Department of Education, **Curriculum Guide for Science 10,** p. 6.
[6]Noll, **op. cit., p. 120.**
[7]N.S.S.E., **op. cit.,** p. 45.

ment in the concerns of everyday living. "No subject matter can be justified solely on the ground that it is 'good science' of a traditional sort or because it can be 'presented' in the classroom with a minimum of effort and planning."[8] Second, the course must not be made too easy. Some previous courses, particularly those which have omitted laboratory work, have been merely "on the level of effortless entertainment."[9] Integrated physical science must not become a watered-down 'snap' course.

Suitability of Generalized Courses

Educators consider the generalized course adequate both for students not going beyond high school, and for those college-bound without scientific interests. This assurance is strengthened by an increasing "disposition of colleges to recognize the physical-science course as a bonafide college entrance unit for the nonscience major."[10]

There is no such agreement, however, regarding its suitability for those proceeding to college specialization in science. The 46th Yearbook cautions that adequate provision for early specialization of selected individuals is a 'must'. Recognition of this fact has created a tendency in some quarters:

> . . . to believe that the courses in physics and chemistry should be retained much in their present form but offered only to those pupils who plan to go on in some field of science as a profession. This would then leave the course in physical science to take care of the functional needs of the young people not specializing in science[11]

Another plan offers a closer compromise between the claims of both functional and specialized science. Tower Hill School, Wilmington, Delaware, uses fused physical science as a basis for specialized grade XII courses in physics and chemistry. The twelfth year consists of two equal sections, one of chemistry and the other of physics. In preparation for this, the fused course is taken in grade XI. Proponents of this scheme contend that it "prepares students for college entrance with the same general background in science as would be obtained from one full year's work in physics and another in chemistry."[12]

In Alberta a somewhat similar practice is used.

Such programs are interesting as attempts to meet the challenge of the 46th Yearbook: "If, however, physical science is to realize its full potentialities, it must be made to serve both as a 'college-preparatory' and as a terminal course."[13]

8Ibid., p. 192.
9Ibid., p. 46.
10Ibid., p. 191.
11E. D. Heiss, E. S. Obourn, and C. W. Hoffmann, Modern Science Teaching, p. 69.
12Progressive Educational Association, op. cit., p. 477.
13N.S.S.E., op. cit., p. 46.

Implementing Integrated Science in Alberta

Science 10 may be considered the first major step towards a functional science program in Alberta for two principal reasons. Firstly, it was designed to replace entirely the traditional specialized sciences of grade X, (chemistry 1 and physics 1). Secondly, it was the initial step in a proposed revision of the entire high-school science program.

Some insight into the construction and aims of the generalized courses in science is obtained by reviewing the stages of their development. As Science 10 is part of a larger program, we have sketched, in general outline, the overall picture without, however, losing sight of Science 10 itself as a major concern.

Implementation of the Integrated Program in Alberta

In November of 1947 a sub-committee of the High School Curriculum Committee, set up for the purpose of reviewing the aims and organization of secondary science, was directed to prepare a plan for a sequence of units in high-school science. This sub-committee arranged for discussions among teachers regarding the nature of any proposed changes. In 1949, encouraged by "evidence of a more receptive attitude toward integrated science courses in the high school"[14] among many groups of Edmonton teachers, the sub-committee went on record as favouring:

1. The principle of integrated courses in science as best meeting the needs of most students in grades X and XI.
2. The possibility in Grade XII of either continuing with a fused course, or of branching into the specialized fields of physics, chemistry or biology.
3. The planning of courses to develop concepts and principles important to all branches of science.

At this point, the sub-committee anticipated future difficulties. The major problems of organizing materials and of gaining teacher and public acceptance for the revised courses were recognized. The important part which the basic text plays in the success of any course was stressed along with the vital need for a text which incorporates the ideas of fused science.

With these danger points in mind, the sub-committee laid plans for the tentative organization of a new course.

By April of 1950 a proposed plan for the reorganization of all high-school science was ready. Composite courses in physical science were proposed for grades X and XI, to lead to either a third

[14]Alberta High School Sub-Committee on High School Science, **Minutes of Meetings for 1949-1951, February 25, 1949.**

fused course in grade XII, or to the specialized courses in physics and chemistry. Separate courses in biology were proposed for grades X and XI as a prerequisite to the grade XII composite course only.

Justification was found for these new physical science courses in their purposes "to acquaint the student with the concepts and principles necessary to his understanding of the world in which he lives."[15] They were to stress the attitudes and skills of science useful in daily living for meeting the demands of intelligent citizenship.

At is point a trial course, organized on the unit plan, was taking definite shape. The units had been tentatively named, and their outlines were well under way. After completion, this course was introduced into the grade X classes of several schools on an experimental basis.

By February, 1951, the sub-committee was also concerning itself with the construction of an integrated grade XI course, as well as with the matter of implementing both the grade X and XI courses officially. The securing of an adequate basic text, the preparation of a booklet on the aims of generalized science, and the gaining of teacher support were problems receiving attention.

When the trial course for grade X came up for review in October, 1951, favourable response from several of the trial schools was noted. A new unit, "The Nature of Matter", was added as background for grade XII chemistry. The search for a basic textbook ended with the selection of *Physical Sciences for Canadian High Schools* which was deemed suitable after suggested revisions.

By December of the same year, after provision had been made for continued evaluation and revision, the trial course was authorized for schools beginning in September of 1952. At this time, too, the proposed grade XI course was outlined in rough for its trial.

The integrated course designed for grade XII, having received university opposition, has not been instituted.

In summary, the interesting points are:

1. The attempts to gain teacher opinion of and approval for, any new course.
2. The concern with the basic textbook as an important foundation for the successful teaching of a course.
3. The desire to create a functional course, i.e., one related to the concerns of citizenship.
4. The concern with important principles and concepts as a focal point for the organization of materials.

[15] Ibid., April 1, 1950.

Science 10—Nature and Aims

A close inspection of The Curriculum Guide For Science 10 not only gives us a clear picture of the organization and objectives of Science 10, but reveals as well the extent to which this course has incorporated the philosophy of functional science.

Objectives and Organization of Science 10.

The following summary statements are derived in the main from the "Curriculum Guide for Science 10", Alberta Department of Education.

1. Science 10, as a course in physical science, "implies a reorganization of subject matter and concepts drawn from the whole science field." This procedure is justified because "in keeping with the contributions which science education may make to all students, this organization of subject matter is deemed most suitable."
2. Science 10, as a functional course, proposes to link the facts of science with the concern of life in a modern society. "The education of youth must provide a basis, not only for understanding and attacking problems within our society, but also for developing some insight into the role of science in the lives of young people."
3. To this end, the materials of Science 10 are "organized to develop important concepts" from various specialized sciences to form an integrated course.
4. Science 10 considers facts important, but they must be used to "achieve all the objectives of science education," of which factual knowledge is only one. "Science education must develop habits, attitudes and understandings, over and above the facts of science."

   At this point, we note a concern with the non-factual or 'intangible' outcomes of science instruction.

The Teaching of Science 10

1. Science 10 consists of six units, each one dealing with a basic theme. The units are:
   (1) The Nature of Things.
   (2) The Earth.
   (3) Temperature and Heat.
   (4) Weather.
   (5) Fire and Fuels.
   (6) Power from Combustion.

2. The materials of each unit have been selected to contribute, when properly presented, to a major concept. As a guide to teachers, a great number of specific procedures are suggested as a means of developing a number of related understandings. These, in turn, lead to the generalizations on which the major concept is based. A list containing understandings, generalization, and the majors, concept, is clearly presented for each unit.
3. Laboratory work is considered to have several functions. Making the student familiar with materials and equipment, and enabling him to gain skill in their use is one; clarifying facts and principles is another. Special emphasis, however, is placed upon the suitability of experimentation for developing problem-solving abilities. Teachers are urged to give these abilities special concern in their laboratory work, and to encourage their transfer to "new and meaningful situations." Thus, experimentation and demonstration are directed "to achieve some purpose above and beyond the activity itself."
4. Teachers are directed to give attention to the use of clear and precise expression through regularly assigned and corrected written work.
5. Evaluation in Science 10 has a broad scope. It should act as a corrective to the teacher in the sense that it indicates how effective his teaching has been. For the pupil, it must appraise his growth in all directions consistent with the objectives of the course. Teachers are cautioned against testing for mastery of facts alone. They must not neglect the "more difficult, but equally important" tasks of testing "habits, skills, understandings of concepts and principles, and attitudes." As a guide in this activity, they are referred to Heiss' *Modern Methods and Materials for Teaching Science.*
6. No specific directions regarding the use of the basic textbook are given. A fairly extensive list of references is presented, however, of which the basic text is considered primary. It is thus implied that teachers will feel free to use one or more sources, as the occasion demands.

Place of Science 10 *in Alberta High School Science Program*

The physical science courses in grades X and XI are deemed to have a two-fold function in that together they are designed to provide the following:

1. A two-year science education of a type suited to all students.
2. A basis upon which any student may undertake grade XII

science courses, and thereby satisfy university entrance requirements.

Such an arrangement is designed "to provide science education suited to all, as well as to equip those with special ability to proceed with more advanced science education."

Science 10 in the Classroom—A Survey and its Results

Some knowledge of two factors is desirable: conditions under which the course is being taught, and teacher reaction to its basic aims. To gather information on these matters, a questionnaire was distributed to a substantial number of Science 10 teachers. Despite this method's shortcomings, the writer was able to set down several general conclusions which, in turn, have led to a number of related recommendations. Neither conclusions or recommendations are absolute and final. They do, however, represent rough indications of possible strength and weaknesses in the course's classroom effectiveness. As such, their use as starting points in any personal or official evaluation may be helpful. To this end, the more important are listed below.

Conclusions

1. There is some evidence that a great many teachers view the present course in Science 10 unfavourably. Criticisms involving the related charges of generality, lack of challenge, repetitiousness and superficiality appear persistently, and are not counterbalanced by similar expressions of commendation. It is difficult, therefore, to ignore the possibility of Science 10 being a somewhat weak course in integrated physical science.
2. The high standards of professional preparation demanded, in the current literature, for teachers of high-school science are not being met in a fairly substantial number of cases. This situation is especially noticeable where Science 10 is being taught by teachers trained in non-scientific fields.
3. While many specific qualities of the basic textbook receive general approbation, a large majority of teachers consider the text superficial, unchallenging, and poorly supplied with stimulating questions and problems. In this regard, the principle criticism of the basic textbook parallels the criticism of the course in general. This may be a most significant point in view of the Sub-committee's concern with the need of a basic textbook as the basis for a successful course.
4. In general, the basic textbook is not used slavishly. Most teachers reorganize and supplement its content in varying degrees.

5. Certain deficiencies in facilities and equipment appear consistently. Of these, an inadequacy of laboratory facilities and materials may prove the most serious.
6. Evaluation in Science 10 appears to be particularly vigorous with regard to formal testing. Most teachers, moreover, supplement formal factual testing in various degrees with other means of appraisal, the results being included in the year's mark. The conscious evaluation of intangible outcomes concerns three-fourths of the teachers although there is some intimation that the methods used may often lean to the casual and unsystematic.
7. Most teachers experiment and demonstrate frequently, with a lesser number permitting at least a fair degree of pupil participation. Laboratory work is carried on for a number of conscious purposes, notably the clarification of scientific principles. Performance on experimental work also serves as an important supplement to formal testing in the evaluating program. There is reason to assume that the potentialities of experimental work in the developing of vital problem-solving abilities are not being fully utilized and that the laboratory programs of certain teachers are somewhat restricted by lack of adequate time or facilities.
8. There is strong adherence to teaching primarily for mastery of content with a large minority of teachers taking this position. Nevertheless, over two-thirds of all teachers do have some deliberate regard for the non-factual outcomes, either as a primary or secondary concern in their teaching. The remainder tend to ignore the intangibles as such in their teaching. A good majority of teachers, including many who do not directly teach for intangible outcomes, attempt, nevertheless, to evaluate their growth. There are indications, therefore, of a certain lack of unanimity among teachers regarding the place and the practicability of teaching and evaluating the non-factual objectives.

Recommendations

1. Greater efforts should be made to assure that, as far as possible, only those properly equipped as teachers of science are placed in charge of Science 10 classrooms.
2. Greater efforts seem necessary to remove deficiencies of equipmen and facilities. Some, or all, of the following may be helpful:
   (a) An official science-room inventory, to be filled in by all science teachers, would pin-point specific shortcomings as a guide for the teachers concerned, as well as give the Department of Education an accurate picture of the situation.

(b) An official catalogue listing suitable equipment, its approximate price and availability, would enable teachers or school officials to secure more readily any required item.

(c) To meet the problem of inadequate libraries, a similar catalogue should be prepared for those attempting to remedy this deficiency. A system of "package deals", may prove effective. Parcels of suitable books, of various sizes and prices, according to the needs of each school, could be prepared under the guidance of the Department of Education. Each package should include subscriptions to two or more suitable scientific magazines.

(d) A section of the Curriculum Guide, listing methods of creating a scientific atmosphere in the classroom, would be a boon to the conscientious teacher, particularly if he is using an ordinary classroom. This section should include directions for the best use of bulletin boards, charts, etc.

(e) Some sort of specific directions should be given to teachers hampered by inadequate laboratory facilities. These directions should concern the best use of available space, effective improvization, and related matters.

(f) Some sort of official science kit may help to overcome the shortage of laboratory materials. These packages would include basic materials for schools of various sizes.

3. Attempt to direct teachers somewhat unconcerned with clear, deliberate teaching for intangible outcomes should be made by:
   (a) setting down more graphically in the Curriculum Guide the specific nature and value of non-factual outcomes.
   (b) stressing more vigorously that these outcomes will most likely appear if they are deliberately taught for.
4. The Curriculum Guide should include a section on definite methods of organizing materials for instruction in the intangibles. Subject matter from the course might well be used for this purpose.
5. The need for purposeful evaluation of intangible outcomes seems to require emphasis. In addition, a number of ready and relatively specific methods of evaluation should be listed as a guide to all teachers, and particularly to those whose evaluation may be somewhat casual or uncertain.
6. More specific guidance regarding use of laboratory work as a means of training for problem-solving abilities seems in order. Methods of encouraging the use of the scientific method in The Curriculum Guide's " new and meaningful situations" would be

particularly helpful to those teachers having difficulty in this respect.

7. As the course outline and the basic textbook share responsibility for any charge of weakness made against Science 10, they may be profitably reviewed together in relation to the following questions:

   A. *The Course*:

      1. Is it too long and too general?
      2. Does it repeat too many grade IX materials?
      3. Are many sections too easy?
      4. Is it doing its full share in providing a proper basis for grade XII work?
      5. Are its materials selected and organized to best provide a highly effective course in integrated physical science?

   B. *The Basic Textbook*:

      1. Are its materials organized most effectively to:
         (a) provide efficient integration of subject matter?
         (b) encourage ready development of major concepts?
         (c) encourage substantial growth towards the non-factual objectives of science teaching?
      2. Do the problems and questions generally lack challenge?
      3. Is its content often presented in too superficial and unchallenging a fashion for grade X?

BIBLIOGRAPHY

Alberta Department of Education. *Senior High School Curriculum Guide for Science* 10 (*Interim Edition*). Edmonton: The Queen's Printer, 1952.

Alberta High School Curriculum Committee. *Minutes of Meetings for* 1947-1955. Edmonton: Department of Education, 1947.

Alberta High School Sub-Committee on High School Science. *Minutes of Meetings for* 1949-1951. Edmonton: Department of Education, 1949-1951.

Heiss, E. D., Obourn, E. S., and Hoffmann, C. W. *Modern Science Teaching.* New York: The MacMillan Company, 1950.

National Society for the Study of Education. *Science Education in American Schools, 46th Yearbook, Part* 1. Chicago: University of Chicago Press, 1947.

National Society for the Study of Education. *A Program for Teaching Science, 31st Yearbook, Part* 1. Chicago: University of Chicago Press, 1932.

Noll, G. W. *The Teaching of Science in Elementary and Secondary Schools.* New York: Longmans, Green and Company, 1942.

North Central Association of Colleges and Secondary Schools. *High School Curriculum Reorganization.* Ann Arbor, Michigan: North Central Association, 1933.

Progressive Educational Association. *Science in General Education.* New York: D. Appleton-Century Company, 1938.

THE EVOLUTION OF THE MATHEMATICS PROGRAMME IN ALBERTA HIGH SCHOOLS

IRENE E. BUCKLES
Strathcona High School

The Early High Schools (1889-1912)

In 1889 the high school made its first appearance in that part of the North West Territories now known as Alberta.[1] The influence of Ontario in the curriculum was conspicuous: a fairly narrow classical curriculum in which mathematics was prominent. The academic content of the programme was suited to the small, relatively select, group of students registered in the secondary schools.

Much of the early emphasis on mathematics was due to belief in the concept of formal discipline. It was commonly accepted that the training gained in studying mathematics would automatically be carried over into all other activities. Locke, one of the early exponents of the theory, believed that the prime purpose of education was to make man a reasoning creature and that no subject could develop the ability to reason better than mathematics.[2] At the turn of the century many psychologists were beginning to test experimentally the validity of the claims made for formal discipline but as yet their influence had not been felt in the classroom.

In 1893 Dr. D. J. Goggin was appointed Superintendent of Education for the North West Territories. In 1902 he thoroughly revised the Programme of Studies for the Territories. "It is the needs of the pupils," said he, "and not the entrance requirements of colleges and professional schools that must shape the high school course of study."[3] But the 'needs' of the average student evidently included high school mathematics. Algebra, geometry and arithmetic were taught in Standards VI, VII, and VIII at the beginning of the period. Trigonometry later replaced arithmetic in Standard VIII.

The early textbook in geometry was MacKay's *Elements of Euclid.* Dr. Goggin recognized that if memorization of proofs was to be minimized, the pure logic of Euclid required mature intelligence. In an effort to compensate for the difficulties encountered by many students he introduced intuitive geometry as a preliminary to the logical elements of demonstrative geometry. He commented:

> At first the pupil should discover geometrical truths through measurements, drawing, construction, and superposition rather than through logical

[1] In 1889 a high school was organized in Calgary with Mr. James Short as principal. See Calgary School District, Province of Alberta, 1885-1935.

[2] Claude H. Brown, **The Teaching of Secondary Mathematics**, pp. 56-84.

[3] **Report of the Council of Public Instruction of the North West Territories, 1900**, p. 26.

> demonstration. In demonstrations, clearness of reasoning, accuracy of statement and elegance of form should be emphasized. The subject matter of each lesson should be considered in its relation to life, i.e., the actual occurrence in nature and in the structure of machines made by man, . . . and the application of the propositions to the ordinary affairs of life should be the basis and the outcome of every exercise.[4]

His adherence to this line of thought appeared to influence the geometry examinations. For example, in 1900, this question was asked on the third class test on Euclid:

> 3. (b) A farm lies between two roads not parallel; determine when possible, where the owner should locate his house, that it may be equally convenient to each road.[5]

An effort to frame questions to determine understanding of basic principles was apparent. Records available seem to suggest, however, that geometry examinations reverted to the more formal type after Dr. Goggin resigned in 1903:

> 13. (a) State definition 5, Book V and illustrate it algebraically.[6]

Baker's *Geometry for Schools* was introduced in 1912, the year in which the Standard System was replaced by the Grade System. It was used as the textbook in grades IX to XII, and gave indication of the first partial break with Euclid in Alberta. Some of the earlier propositions were simplified, some omitted, and the sequence was changed. Baker recommended that geometry should not be completely dissociated from the other branches of mathmatics studied at the same time.

Hamblin Smith's Arithmetic, which was the prescribed textbook in the first high schools, was an English textbook adapted to Canadian schools. The Preface states: "Special care has been taken to adapt the work to the wants of the business community." Highly complicated mechanical questions were common, for example:

$$\frac{\frac{1}{21} \times 5\frac{17}{23} \times 6\frac{3}{11} + 6\frac{19}{51} \times 1\frac{23}{49} \div 2\frac{5}{17} + 1\frac{10}{49}}{9\frac{16}{57} \times 1\frac{22}{23} \div 5\frac{17}{38} + 3\frac{11}{78} \times 6\frac{17}{21} \div 7\frac{21}{32}} \times 12\frac{4}{9}$$ [7]

Some of the problems bear little relationship to the experience of the students:

> No. 169 Of two stalactites hanging from the flat roof of a cavern, one is 1.02 inches longer than the other, and the shorter one increases in length at the rate of 3.014 inches in a century. Find the rate of increase of the other in order that they may be of the same length at the end of 125 years.
>
> No. 249 Two elephants which are 10 in length, 9 in breadth, 36 in girth and 7 in height consume one drona of grain; how much will be the

[4] **Annual Report of the Council of Public Instruction, North West Territories, 1900, p. 27.**

[5] **Annual Reports of the Department of Education of the North West Territories, 1900-1903, p. 90.**

[6] Province of Alberta, Department of Education, **Annual Report, 1912, p. 225.**

[7] **Hamblin Smith's Arithmetic,** adapted to Canadian Schools by Thomas Kirkland and William Scott, **1877, p. 70.**

[8] **Ibid., pp. 276, 249.**

> rations of 10 other elephants which are a quarter more in length and other dimensions.[8]

A report of the markers of the arithmetic examination papers suggests that inaccuracy in calculation and careless reading habits were the chief factors contributing to lack of mastery of this subject:

> Inaccuracy in calculation, especially where fractions enter in, is a marked feature of the work. The reasoning of the better candidates is very fair but there is room for additional training in the expression of this reasoning. Too many candidates think more of getting the answer than of presenting a logical solution in good English . . .
>
> Inability to read the questions intelligently seems a too common cause of failure. Reasoning power is good but the expression of reasoning in logical order and good English, while an improvement on last year's work, is still not up to standard . . . Neglect to draw figures is the prime cause of failure in a number of solutions in mensuration.[9]

Opinions similar to those expressed in the reports quoted above were also heard in the United States during these early years. F. Milner, for example, in the School Review of February, 1898, comments:

> Each September finds me ready to begin the review of arithmetic with my 140 or more seniors . . . My pupils are not accurate in computation, they do not hold themselves responsible for such accuracy; they have no habit of persistently checking their work at each step to be sure of themselves by the way. They are afraid of a fraction. If the result fails to "come out even" they are in despair. If they chance to discover that others in the class get the same result, they take courage, but their own work does not carry conviction, for they have not learned to rely on their own judgment. They are not sensitive to the reading of a problem, and consequently have no basis for a logical method of attack. They fail to see that arithmetic is part of a great mathematical whole . . .[10]

No doubt this opinion, expressed nearly sixty years ago, has been repeated many times since, and would not appear out of place in a School Review of 1956.

The only professional leadership that the mathematics teachers in Alberta received in the early 1900's was that offered by the inspectors on their infrequent visits.

J. A. Smith, of the High River Inspectorate, made several comments that suggest that he was endeavouring to guide the teaching of mathematics in his area:

> I would like to see more original thinking in the study of arithmetic in the higher standards. Encouragement should be accorded the pupil who proposes an alternative form of solution, even though it be long and clumsy, for it is the best solution for the individual, since it is his own thinking. The exultation of individual discovery and accomplishment in invaluable in the study of arithmetic . . . The teaching of algebra in many schools is nothing but a confused juggling with symbols. The weakness in the teaching of this subject I attribute to its entire separation from arithmetic.

---

[9] **Annual Report of the Department of Education of the North West Territories, 1902, p. 22.**

[10] Milner, F., "What Ought the Study of Mathematics to Contribute to the Education of the High School Pupil?" School Review, 6: 10-115 (Feb.) 1898, as quoted in Kinney and Purdy: **Teaching Mathematics in the Secondary School, p. 17.**

> The teacher should see that the pupil constantly holds fast to the shoreline of arithmetic while he ventures out upon the sea of algebra.[11]

Inspector Smith's comments were probably a reflection of a general move in both England and United States at this time. Perry in England and Moore in America were calling attention to the need for reorganizing curricula with special emphasis on correlation, rather than strictly compartmentalizing mathematical subjects.[12]

Mechanical application of rules with little reference to practicality was typical of many examination questions in those days. The first two questions from a 1906 final examination in arithmetic illustrate this tendency:

(1) What part of 12 bushels of wheat is

$$\frac{1}{7} \text{ of } \frac{2\frac{1}{4} - \frac{2}{3} \text{ of } \frac{1}{4}}{\frac{1}{5} \text{ of } 3\frac{1}{3} + 1\frac{3}{36}} \text{ of } \frac{2}{11} \text{ of 5698 bushels?}$$

(2) Divide 180 by 3.14159265 correct to five places of demicals.[13]

Dr. Goggin selected C. Smith's *Elementary Algebra* as algebra textbook for the three high school Standards. His choice was apparently a popular one because this book remained in use in Alberta schools for more than twenty years. Each topic in Smith's book was presented by means of definition of terms, followed by examples, and then practice was given in the application of rules. The need for a yearly preliminary review of algebraic theory was recognized, as in Standard VI, Chapter I to XIV were prescribed, in Standard VII, Chapter I to XX, and in Standard VIII, the entire book. Thus the course recommended spiralling, even though Smith's textbook did not follow such a plan.

By the year 1910, regardless of the fact that Dr. Goggin's programme of studies had met with approval, there had been several suggestions that a revision should be made. Perhaps educationalists were anxious to formulate a programme that was strictly an Alberta product. The Alberta Trustees Association, newly organized, early expressed an interest in curriculum. Dr. W. D. Ferris, President of the Association, stated in 1909:

> There are several factors in our school system which tend to injure the health or our growing boys and girls—and what I am saying here applies more especially to the future mothers of our nation. In many cases the hours of study are too long. There is an overload of home work . . . Why should the fast-growing girls of to-day be made the hysterials, neurosthenics and childless wives of to-morrow[14]

In answer to the general demand, a committee, with Dr. Tory as Chairman, was chosen to revise the high school course. Under the

---

11Province of Alberta, Department of Education, **Annual Report, 1908,** pp. 53-54.
12Kinney and Purdy, **op. cit.,** p. 23.
13Province of Alberta, Department of Education, **Annual Report, 1906,** p. 133.
14Report of Annual Convention, Alberta School Trustees Association 1909, 1. 17.

revision, which was ready by 1912, mathematics occupied an important place. As yet there was no apparent move against compartmentalization. The new course prescribed algebra and geometry in Grade IX, X, XI, and XII, arithmetic in Grades IX and X, and trigonometry in Grade XII.[15] At no time in the history of the Province has mathematics occupied a more prominent place in the curriculum.

The First Great War Influences Curriculum

The 1912 programme of studies was in use throughout the war years and continued to be in effect until the curriculum revision of 1925 was completed. This period tells a story of inadequately trained teachers, of crowded schools, of expressed doubt as to what the content of the curriculum should be, and of a new concern on the part of the public at large regarding the aims of education.

Educational leaders were aware that with a growing non-selective high school population, reorganization of the academic programme was essential. The Alberta Teachers' Alliance, which had been established during the war years, sent an official questionnaire to all Local Alliances in 1921 requesting discussion of the type of curriculum deemed most desirable. D. L. Shortliffe, an Edmonton mathematics teacher, maintained that two fallacies worthy of thoughtful consideration existed. The first fallacy was that all children are approximately equal in talent, and hence no choice regarding curricula is needed. The second fallacy, which negates the first, is that since not all children have the same ability, the curriculum ought to be adapted to the most poorly equipped. He said:

> Fully fifty per cent of our present high school population, or at any rate, those above Grade IX, should be at good technical, commercial or agricultural schools. Then we could carry on in the various types of schools a system of intensive training with the kind of pupils adapted to it, instead of suffering under the present chaos, which seems to get worse instead of better with every new and high-sounding innovation . . . We simply cannot get results of any sort, theoretical or practical, by trying to teach everything from biscuit-rolling to astronomy to the same individual.[16]

Shortliffe's comments lead us to believe that the nature of the high school population had changed and the selective factor no longer existed.

In 1921, A. B. Hogg, a trustee, stated his opinion regarding curriculum at the trustees' convention:

> . . . I contend we must adhere to the old-fashioned doctrine of the three R's. The three R's, like the alphabet, are not merely funds of knowledge, but are the very means by which one acquires knowledge. A

[15]Province of Alberta, Department of Education, **Annual Report, 1912**, pp. 146-154.
[16]**A.T.A. Magazine**, February, 1921, p. 22.

> boy fifteen years old can learn, fairly well, the science of farming by working on a farm. He can learn it better if he can read well, write well and figure well. But on the farm there is not likely any way of his learning readily to read, write and figure. Let him learn, then, at school, first of all, these essentials. Technical Education or vocational training may well remain a subject for students well advanced.[17]

A truly democratic attitude toward curriculum, no doubt accentuated by post-war opposition to anything dictatorial, was apparent as the background of preparation, for the new programme of studies requested "the opinion of teachers of trustees, of the U.F.A., of the U.F.W.A. of the Women's Institutes, of Boards of Trade, of Canadian Clubs, of Rotary Clubs, of Inspectors, in fact of almost every organization in the Province."[18]

As a result of the revision the number of subjects that any pupil must take was materially reduced, and the student was given five choices from which to select his course: Normal School entrance, matriculation to university, commercial, technical, or a genral course. This new programme, which also introduced the unit system, was established by 1925.

The content of the mathematical subjects, under the revision, was not materially changed except in the amount prescribed. Algebra and geometry were offered for three years instead of four. Algebra lost little in quantity but gained in intensity. Theoretical geometry was to be completed at the junior level and analytical geometry at the senior level. Arithmetic was offered only at the Grade XI level. It was hoped that by reducing the number of subjects, hence increasing the time per subject per week, better results would follow than when the subjects were spread over more years.

Crawford's *High School Algebra* replaced C. Smith's textbook. The authors stated that it was written from the standpoint of the pupil, and in such a form that he would be able to understand it with a minimum of assistance from the teacher.[19] The question method is frequently used in developing the theory.

McDougall and Sheppard's *High School Geometry* replaced Baker's textbook. McDougall and Sheppard aimed to produce a course in theoretical geometry that would be in accord with current scientific and pedagogical thought and would meet the demands of the geometry courses as outlined in the 1925 revision. It appears that the thinking at this time was shifting from the theory of mental discipline, which had long been a popular one, to giving the learner something that would contribute to a broader and more useful life. Transfer of training was also being viewed more realistically and

17 **Alberta School Trustees' Association**, Report of Annual Convention, 1921, p. 15.
18 **Ibid.**, pp. 46-47.
19 **J. T. Crawford, High School Algebra**, Preface, p. v.

the hope was expressed that teachers would realize that transfer would not take place unless the work was properly developed.

The Trend Toward Unified Courses

When the 1925 curriculum was introduced it was expected that the average student would be able to undertake and complete seven units per school year. Before long it became apparent that although students were attempting seven units, very few passed that number and the average student could be expected to spend at least five years in high school. The changing nature of the secondary school population was to a large extent responsible for adjustments necessary in the mathematics programme during this period.

The subject that was proving most difficult to the non-selective group of students in high school at this time was the Grade XI course in arithmetic. Under the 1925 revision, arithmetic, which previously had been offered in Grades IX and X, was to be studied for one year only, preferably in Grade XI. Mensuration, percentage, and business mathematics, formed the core of the course. Stanley's *A Canadian Arithmetic for High Schools* was the prescribed textbook in 1925. It is interesting to note that Inspector J. A. Smith when commenting regarding arithmetic, did not recommend that the course be simplified and brought down to the level of the pupil:

> The teachers handling this subject find that the majority of the students have not the necessary thorough background to handle successfully the course prescribed. There seems to be throughout the province a very strong demand for two years of arithmetic in the high school. Raising the standard of the Grade VIII course in arithmetic might meet this demand.[20]

Teachers of the Province generally, in response to Alberta Teachers' Alliance questionnaires, stated that the arithmetic course was far too long. The trustees too, protested by means of resolutions at their annual conventions:

> Resolution No. 25
> Resolved, that the subject of Arithmetic be taught in Grades IX, X, and XI.
> Pincher Creek S.D. No. 121.[21]
>
> Resolution No. 18
> Resolved that the content of Arithmetic in high schools be spread over two years and to meet this that the content of History in IX and X be reduced.[22]

Mr. McNally, in speaking to such resolutions, said:

> Arithmetic is not being taught in Grades IX and X for the simple reason that you cannot reduce the number of subjects carried in any one year without taking something off. With our new and better way of teaching arithmetic in the public school in the elementary grades, and one year of arithmetic in Grade XI confined to the application of practical arithmetic, there is ample attention given to the subject.

20Province of Alberta, Department of Education, **Annual Report, 1925, p. 20.**
21**Alberta School Trustee Magazine, 1925, p. 64.**
22**Alberta School Trustee Magazine, 1927, p. 36.**

The 1939 secondary revision programme deleted arithmetic as a separate course.[23]

By the year 1932 there was much discussion regarding the type of Grade XII mathematics course best suited to the needs of Alberta students. There were educationalists in both the United States and Canada who were advocating unified mathematics. It was not a new idea. As far back as the early 1900's Professor Felix Klein of Germany stated that the fusion of plane and solid geometry, and of arithmetic and geometry, should be encouraged.[24]

Professor William David Reeve of Columbia University recommended that mathematics should not be taught in "water-tight" compartments, but that whenever possible, correlation should take place.[25] Much experimentation in correlation was attempted in the United States and perhaps the most concrete results took the form of general mathematics courses.

It would appear, however, that Alberta teachers were not enthusiastic about the proposed unification of Grade XII mathematics. D. L. Shortliffe, Edmonton, in a letter to the editor of the A.T.A. Magazine, claimed that there were two main advocates of unified mathematics. First, the university professors wanted it because they claimed it was just the preparation needed for the coming scientist or mathematician. The other group, he asserted, was made up of the fond parents of adolescents who found the present course hard. They had the idea that a unified mathematics course would be an easy one. Shortliffe said:

> To a mathematician, trained under the old system, the unified course will look easier than the present course. To the experienced teacher it will appear much harder. They are both correct! The mathematician looks at it from the standpoint of the ease with which he, with his training under another system, can grasp the principles and solve the problems. The teacher looks at it from the point of view of one whose job it is to 'put it over'.[26]

The Algebra 3 course was revised in 1934, at which time a new textbook *A New Canadian Algebra* by Durell and Wright came into use. Elementary work in calculus was included in the high school programme for the first time. *A New Canadian Algebra* presented exercises from which inductions were to be made. The student's concept of the law was to grow gradually as he worked through the examples:

> Repetitions of special types may eventually induce some kind of facility

---

23 **Alberta School Trustee** Magazine, 1925, p. 64.

24 Klein, Professor Felix, **Elementarmathematik vom hoheren Standpunkte aus Theil II, Geometrie**, pp. 435, 437, as in Fifth Yearbook, National Council of Teachers of Mathematics.

25 **National Council of Teachers of Mathematics**, The Fourth Yearbook, p. 143.

26 **A.T.A. Magazine**, July, 1932, pp. 9-16.

> in handling them, but this method dulls the mind; it is variety alone which makes the pupil keep thinking.[27]

The adjustment of many teachers to the content and aims of the new course was not easy. During the Summer School sessions of 1933 and 1934 special classes were held for teachers of Grade XII algebra in order that the revised course might be reviewed.

The results of the 1938 final examination in Algebra 3 showed, in the opinion of the marking group, " a lamentable and widespread ignorance of the most elmentary ideas and manipulations involved in the course."[28] In deploring the poor results, S. W. Hooper said of the Algebra 3 course:

> There is no definite limit to what the course contains. In many questions a principle is implied, the teacher may draw attention to it, and presumably the students understand its significance. Unfortunately in too many cases the principle is met with only once, and teacher and students alike assume that the point, though interesting, is merely a side issue in the general subject under discussion. The result is that the course becomes a voyage of discovery with a great many detours on the way, all of course having some connection with the general route.[29]

He suggested that in theory, the aim of the new course was good, but lack of a definite limit rendered the external examination difficult.

In 1934 the Honorable Perren Baker appointed a General Committee to revise the curriculum. This Committee took into consideration the large heterogeneous school population when they made their recommendations. The revised programme was introduced in all high school grades by 1939. A change was made from the "unit" system to the "credit" system. Algebra I, Geometry I, Algebra 2, and Trigonometry and Analytical Geometry were academic electives worth five credits each. General Mathematics 1, 2, and 3, newly introduced, were optional subjects worth five credits each.

It was hoped that the general mathematics courses would meet the needs of students whose aptitudes did not lie in the field of mathematics and who would not profit from the study of algebra and geometry. The teacher of general mathematics courses was not required to cover any prescribed minimum of work. It was hoped that the students would be kept working at optimum efficiency on meaningful problems. A library of books was suggested in lieu of a single textbook. The programme of studies submitted a list of forty-six books from which to choose.

27C. V. Durell and R. M. Wright, **Senior Algebra, Preface.**

28Stead Wannop Hooper, "A Report on the Algebra 3 paper of June, 1938," thesis for M.A. degree, Edmonton, 1941, p. 1.

29**Ibid., pp. 54-55.**

The new programme stated, with regard to algebra, that it was intended that the subject be approached from the point of view of the variable and function. The textbook selected in 1937 for Algebra 1 in order to implement that theory was *Algebra for Today* by Betz, Robinson, and Shortliffe. A comment from the report of the high school inspectors in 1938 suggests that the new textbook was meeting with approval:

> The new algebra text is serving to re-direct the work toward more thorough understanding of basic concepts and relationships, and away from long drills on the manipulation of poorly-understood symbols.[30]

Geometry for Today by Cook, which was the prescribed textbook in Geometry 1 at this time, encouraged a more informal approach to geometry. Memorization of propositions was definitely discouraged as the book provided very few proofs, and practical applications of the propositions were emphasized. The student was encouraged to explore, to organize, to devise his own statements of findings and to construct his own proofs.[31]

The course in Trigonometry and Analytic Geometry aimed to "supplement the work of Algebra 2 with respect to the trigonometric functions and the graphical representation of functions."[32] It dealt with some of the geometric properties of conics, and introduced some exercises in mechanics. During the year 1940-41 the course was to be based on material selected from three books: Conant, *Plane Trigonometry;* McDougall and Sheppard, *Analytical Geometry for High Schools;* and Merchant, Chant and Cline, *Mechanics, An Elementary Textbook.* Despite the use of three textbooks, the parts of the course were not to be treated separately. In so far as possible they were to be integrated with frequent reference to relevant parts of the course in Algebra 2. Thus, an attempt to encourage unified mathematics was made.

Recent Revision

By the early 1940's there appeared to be some question as to whether students of mathematics could achieve the same standard as formerly. H. C. Newland, Supervisor of Schools, stated in his Annual Report for 1940 that the new course was apparently acceptable to students, teachers and parents, but that there were still some critics who complained about the lowering of academic standards:

> . . . it must be conceded that the high school group as a whole, embracing as it does a wider range of ability than ever before, cannot reach the same standard in a subject like mathematics that is attained by a select group.

[30] Province of Alberta, Department of Education, **Annual Report, 1938,** p. 47.
[31] **A. J. Cook, Geometry for Today,** Preface, pp. v-vi.
[32] **Program of Studies for the High School,** Bulletin I, 1940, p. 22.

> But with a rigid programme, dominated by academic subjects, only two results were possible; either the standard of achievement was lowered, or a large number of students—almost a majority—was habituated and inured to failure. With the revised programme, students can be graduated from the high school without failure if they elect the subjects proper to their aptitudes and interests; and if only those students attempt advanced mathematics who have a flair for the subject, the standard of achievement will not be lowered; on the contrary it will be raised.[33]

It became clear that the majority of students would persist in selecting algebra and geometry rather than general mathematics. E. L. Fuller, Chief Inspector of Schools, commented with regard to the revised programme, that general mathematics was not fulfilling the high hopes under which it was launched. In many centres the subject was endured as a necessary evil, a hurdle that the C students must surmount in order that they might take their places in the traditional route leading to matriculation.

In 1941 A. J. Cook provided a provisional course for Alberta schools in which he presented a unified treatment of trigonometry and analytical geometry. There seemed to be fairly wide-spread agreement among teachers, by 1945, that the course was too extensive to be covered in one year. The high school inspectors suggested that the difficulty was due to the fact that many students who were attempting the course lacked both interest and ability to complete successfully academic courses in high school mathematics.[34] The curriculum committee investigated and reported with regard to the A. J. Cook textbook in trigonometry and analytical geometry as follows:

> The sub-committee thought that, although the present book contained a great deal of valuable material, its form and style did not meet the needs of the majority of teachers. The sub-committee recommended that a new book be selected for the school term 1947-48, and that this book be Sprague's "Essentials of Plane Trigonometry and Analytical Geometry."[35]

Sprague's textbook, after certain revisions, was prescribed in Alberta high schools in 1947. The reception of the book was favorable.[36]

A report of the Curriculum Branch written by M. L. Watts, Director of Curriculum, for the 1951 Annual Report stated that it was felt that three courses in mathematics, one each in Grades X, XI, and XII should replace the four courses presently required in the academic programme.[37] Consultation between the high school curriculum committee and those members of the university staff who were familiar with the needs of the university with regard to

[33]Province of Alberta, Department of Education, **Annual Report, 1940**, p. 17.
[34]Province of Alberta, Department of Education, **Annual Report, 1945**, p. 33.
[35]Province of Alberta, Department of Education, **Annual Report, 1946**, p. 56.
[36]Province of Alberta, Department of Education, **Annual Report, 1947**, p. 44.
[37]Province of Alberta, Department of Education, **Annual Report, 1951**, p. 53.

mathematics, was recommended. The feeling of the two groups seemed to be:

> While the result will no doubt be that, at the end of Grade XII the amount of content covered is somewhat reduced, it is hoped that the necessary basic training will be given, and if first year university courses are well adjusted to the high school training, again, looking at the program of high school and university as a whole, it is felt that there need be no real lowering of standards.[38]

One feature of the revised mathematics programme was a new nomenclature for all courses. Grade X courses were to have numbers such as 10, 11, and 12; Grade XI courses numbers such as 20, 21, and 22; and Grade XII courses numbers such as 30, 31, and 32.

The chief change in Grade X mathematics was the deletion of general mathematics. Three new courses were introduced. Mathematics 10 is primarily academic in nature, encompassing study of algebra, geometry, and arithmetic. Mathematics 11 is a course in business arithmetic, and Mathematics 12 is intended primarily for students who choose an industrial arts pattern in high school.

At the Grade XI level, Mathematics 20 is basically an algebra course, but since no provision had been made for the teaching of locus and the circle in Mathematics 10, these two topics were added to the Grade XI course. Mathematics 21 and 22 are essentially extensions of the Mathematics 11 and 12 courses.

In 1953 the new Grade XII course in mathematics was introduced. One course, Mathematics 30, took the place of the two formerly offered. Miller and Rourke's *An Advanced Course in Algebra* was the basic textbook. The first three chapters of Sprague's *Plane Trigonometry and Analytic Geometry,* dealing with logarithms, trigonometric ratios, and the solution of the right triangle, were authorized. One chapter from *Mathematics for Canadians,* Book 3, which has reference to systems of equations, formed a third section of the course. The elements of calculus were not included. In the preface to *An Advanced Course in Algebra* the authors state, "Emphasis should be placed, not on the manipulation of expressions and equations but rather on the use and the interpretation of relationships between variable quantities."[39]

It was found advisable the next year to introduce Mathematics 31, a three-credit elective in trigonometry and analytic geometry, for "the small group of students who might need such a course to meet the matriculation requirements of certain universities."[40] The

[38] **Ibid., p. 53.**

[39] Norman Miller and Robert E. K. Rourke, **An Advanced Course in Algebra, Preface,** p. vi.

[40] **Province of Alberta, Department of Education, Annual Report, 1955, p. 49.**

1955-1956 University of Alberta regulations stipulated that Mathematics 31, with B standing or better, would be required for admission to all Bachelor of Science programmes in the physical sciences.[41]

Present Trends

The high school population during the early years was small and selective. There can be no escaping the fact that high school enrolments today are steadily increasing and that the interests and abilities of high school students are exceedingly varied. The Curriculum Branch of the Department of Education asserts:

> Mathematics is valuable and important in the modern world and therefore all students entering high school have need for more mathematical training [42]

Among the factors that are exerting an influence on present-day mathematics curriculum are tradition, modern educational philosopy, examinations, and the university.

Through tradition, subjects such as mathematics, once established in the curriculum, have a tendency to maintain their places. The feeling of satisfaction with the status quo has a stabalizing influence on mathematics curricula.

Traditional ideas regarding transfer of training have been dealt a blow. Professor C. H. Judd challenges teachers of mathematics in this statement:

> Mathematics as a subject cannot be described in my judgment as sure to transfer. All depends on the way in which the subject is handled . . . Transfer is a form of generalization, and training can be of such a type as to hinder generalization.[43]

Professor John Dewey also suggests that the educational values of mathematics represent, not values inherent in the subject itself, but rather possibilities to be realized through effective teaching. He feels that mathematics has a place in a programme of democratic education only if by studying it a student becomes more competent to cope with life.[44]

In the setting of examinations an attempt has been made to keep pace with the changing mathematics curriculum. The 1956 examination in Mathematics 30 presented thirty-seven questions, covering much of the year's work. The examination endeavoured to do more than test the measure of retention of memorized material.

Sub-examiners responsible for the marking of the final examina-

41 **University of Alberta Calendar, 1955-56,** p. 46.

42 Province of Alberta, Department of Education, Senior High School, **Curriculum Guide for Mathematics, 1954,** p. 2.

43 Taken from **Report of the National Committee on Mathematical Requirements** as quoted in R. E. K. Rourke, **A Target for Teachers of High School Mathematics,** p. 4.

44 Claude H. Brown, **The Teaching of Secondary Mathematics,** pp. 129-130.

tion papers in Mathematics 30 in 1955 commented that the students could not handle fractions adequately, their graphs and diagrams were untidy and inaccurate, they failed to set up proper statements, and they lacked precision in mathematical language.[45] These comments are surprisingly similar to those made by F. Milner fifty-seven years earlier.[46]

The university has signified concern for the future of high school mathematics. In 1955 a university professor was invited to mark examination papers in Mathematics 30 in order that the university might receive a picture of the mathematics situation in the Province.[47] Dr. W. G. Hardy, Professor at the University of Alberta, was responsible for a series of articles in the *Edmonton Journal* entitled "Education in Alberta", in which he said:

> . . . a new course, Mathematics 1, to meet the watered-down content of high school mathematics, had to be put into the first year . . . because of the lowering of the standard in high school mathematics it will be more difficult to equip our graduates in engineering properly.[48]

It is apparent that the high school mathematics programme must undergo constant revision if it wishes to keep pace with changing social conditions. To this end, curriculum revision committees are a permanent part of the educational system. The present programme in mathematics with its academic, business, and shop patterns, results in a vast majority of students electing the academic pattern. Thus there is wide divergence of ability among the students in today's mathematics classes. It would appear that there is little recognition of the rights of the more capable students who could benefit from an enriched mathematics programme.

Conclusions

1. The theory of formal discipline to a large extent has been discredited in Alberta schools. Educationalists responsible for courses and textbooks, however, concede the fact that transfer of training is a possibility if made the specific aim of the learning.
2. In Alberta, efforts to fuse mathematical subjects have not been notably successful. An attempt was made to provide an integrated course in trigonometry and analytical geometry but the results of the experiment were disappointing.
3. Courses in general mathematics, introduced in Alberta to accommodate those students whose abilities were not academic in nature, did not achieve their purpose. Most of the high school

[45] Report by Miss E. Jagoe, Chairman of Mathematics 30 markers.

[46] Note statement by Milner, p. 246.

[47] Dr. Crosby of the University of Alberta Mathematics Department joined the group of Mathematics 30 markers.

[48] Edmonton Journal, February 5, 1954, p. 7.

students continued to select the traditional algebra and geometry courses.

4. Examinations in Alberta have kept pace with changing philosophies of education. The formal examinations at the beginning of the period were administered to all high school students in all prescribed courses. At the present time, external examinations, based on fairly generalized knowledge, are administered only to students at the Grade XII level.
5. It would appear that the average standard of achievement in mathematics in Alberta, by the time students complete Grade XII, has been lowered. The University has introduced Mathematics 1 to supplement Grade XII mathematics in order that a foundation for the regular university courses may be provided. Heterogeneous grouping practice may be contributing to a lowered standard. It is likely that no single sequential course can meet the needs of all types of students, grouped heterogeneously, in our high schools.

BIBLIOGRAPHY

Alberta, Department of Education, Senior High School, *Curriculum Guide for Mathematics,* 1954.

Province of Alberta, Department of Education, *Annual Reports,* 1906-1955, Edmonton.

The North West Territories, Council of Public Instruction, *Annual Reports,* 1896-1900, Regina.

The North West Territories, Department of Education, *Annual Reports,* 1900-1903, Regina.

University of Alberta Calendar, 1955-1956, Edmonton.

Alberta School Trustee Magazines.

Alberta Teachers Association Magazines.

Edmonton Journal, February 5, 1954.

Calgary School District, Province of Alberta, 1885-1935, Booklet, Calgary, 1935.

Brown, Claude H. *The Teaching of Secondary Mathematics.* New York: Harper and Brothers Publishers, 1953.

Cook, Alexander J. *Geometry for Today.* Toronto: The Macmillan Company of Canada, 1940.

Crawford, J. T. *High School Algebra.* Toronto: The Macmillan Company of Canada, 1934.

Durell, C. V. and Wright, R. M. *Senior Algebra.* Toronto: Clarke, Irwin and Company, 1940.

Hamblin Smith's Arithmetic, adapted to Canadian Schools by Thomas Kirkland and William Scott. Toronto: Adam Miller and Company, 1877.

Hooper, Stead Wannop. "A Report on the Algebra 3 Paper of June 1938." Unpublished Master's thesis, The University of Alberta, Edmonton, 1941.

Kinney, Lucien Blair and Purdy, C. Richard. *Teaching Mathematics in the Secondary School.* New York: Rinehart and Company, 1952.

Rourke, Robert E. K. *A Target for Teachers of High School Mathematics.* Pamphlet outlining a paper given before the Canadian Mathematical Congress in Vancouver, 1949.

The National Council of Teachers of Mathematics. The Fourth Yearbook, 1929. The Fifth Yearbook, 1930. New York: Teachers College, Columbia University.